FOOD MANUFACTURE

Incorporating Food Industries Weekly

A PUBLICATION OF THE LEONARD HILL TECHNICAL GROUP MAY 1, 1958

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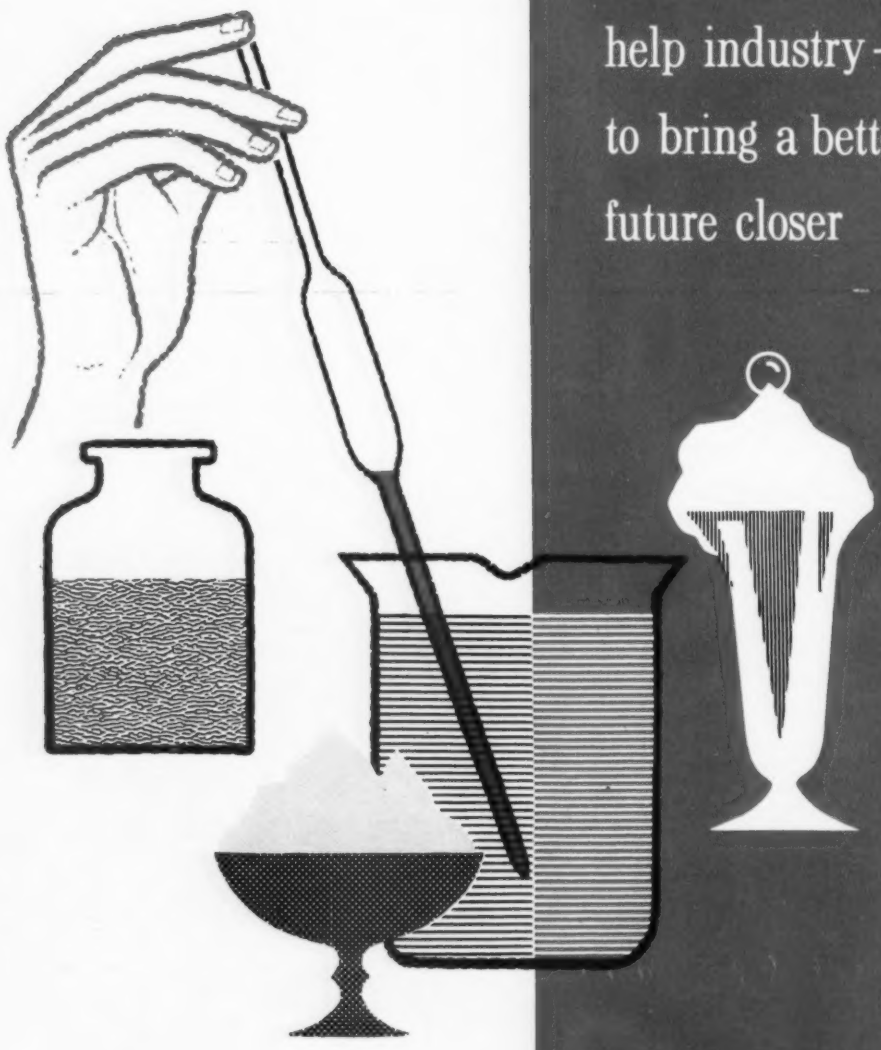

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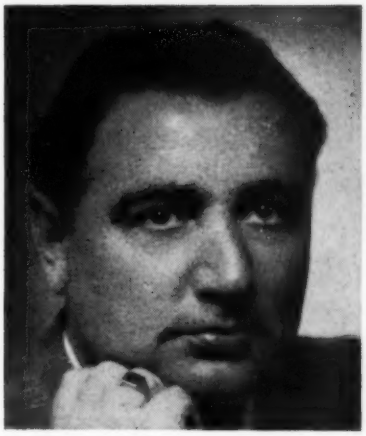

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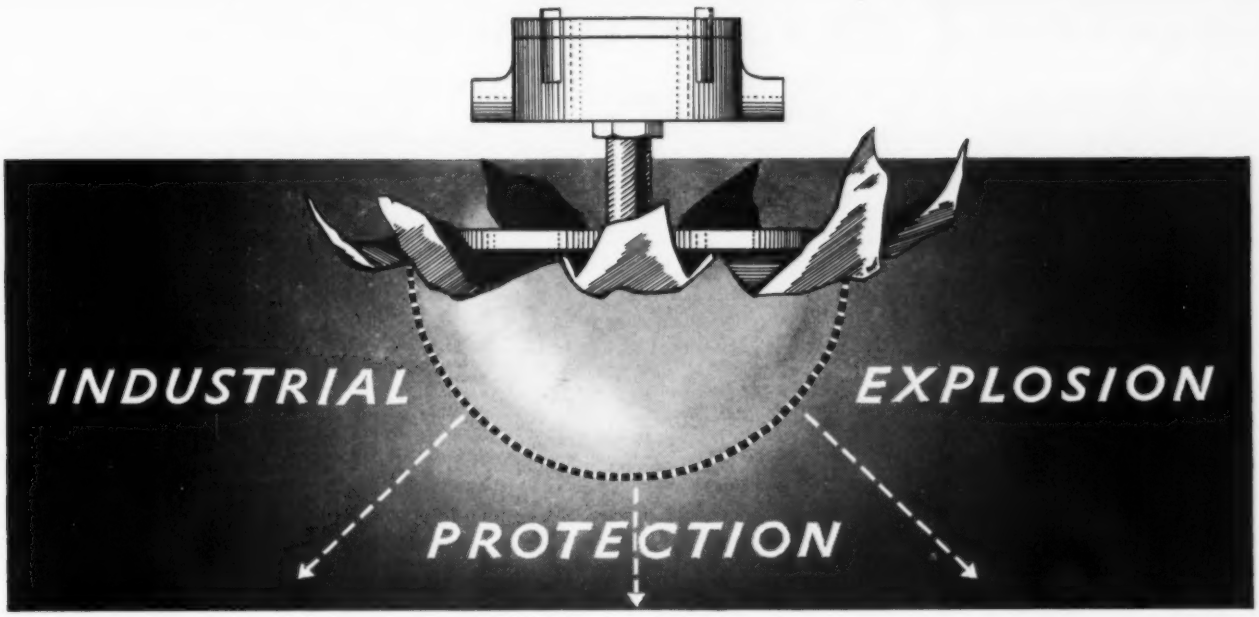
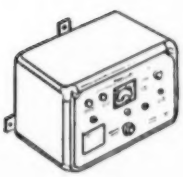


Any material that will burn in the bulk can explode as a dust/air mixture when sufficiently finely ground. Explosions are therefore liable to occur in any plant where such materials are processed or handled.

Illustrated below are just a few of our many types of equipment for combating explosions.

PNEUMATIC EXPLOSION DETECTOR for the detection of explosions very early in their pressure growth.



ELECTRICAL POWER UNIT provides the current for operating equipment when explosion detector contacts close.

"ARMOURPLATE" GLASS BURSTING DISC for the relief of gaseous and dust/air mixture explosions.

HIGH RATE DISCHARGE BOTTLE used when hemispherical suppressors can not be accommodated internally.

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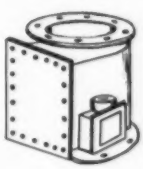
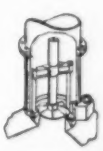


HIGH SPEED ISOLATION VALVE for preventing flame in ducting. An eight inch valve fully closes in eighty milliseconds.



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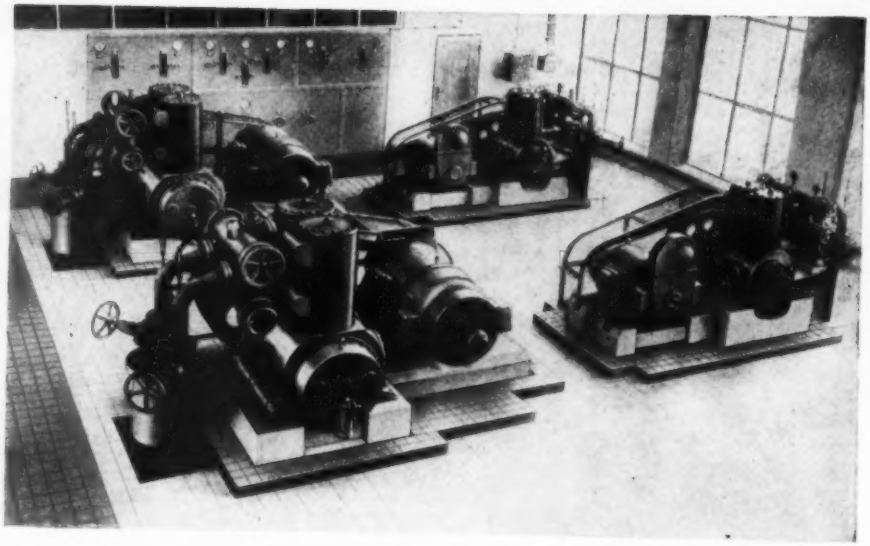

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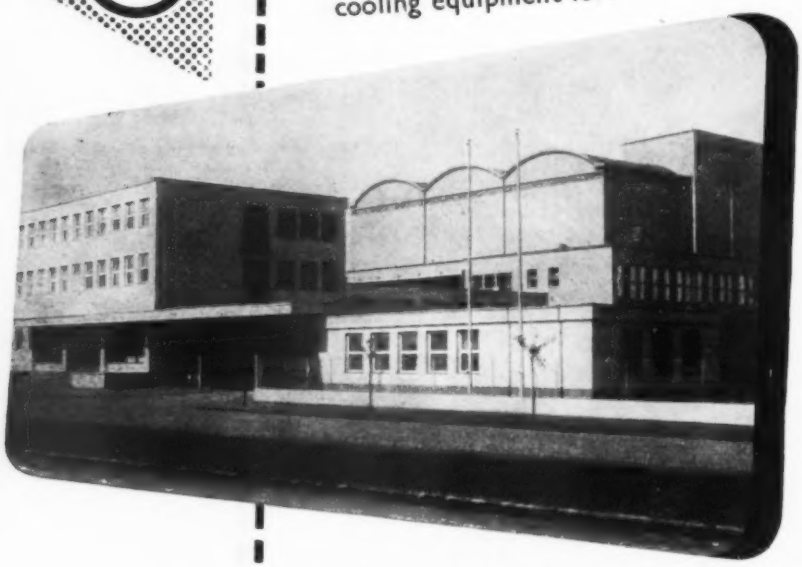

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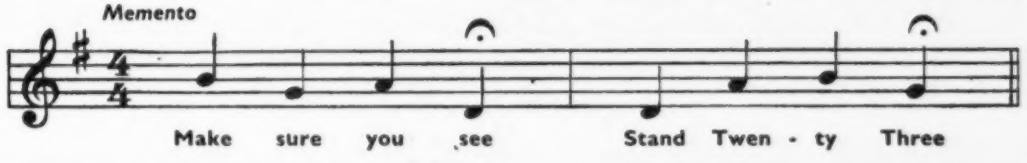
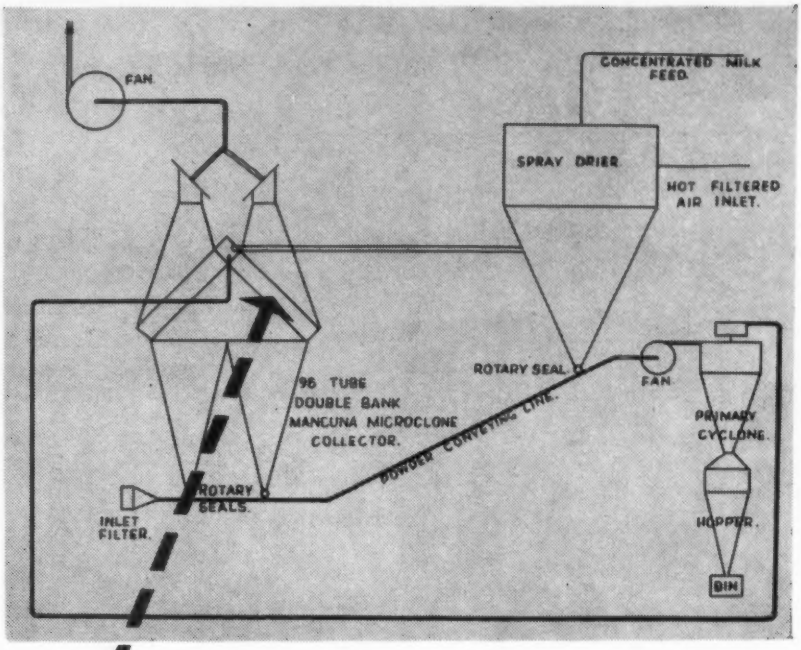

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PROBLEM	
Product	Cream of Tomato Soup
Throughput	100-400 gallons per hour
Power	under 3 h.p.
Location	very little floor space available
Labour	only semi-skilled available
Quality control	a smooth, completely homogenous soup
Budget	£300

The RAPISONIC homogenizer takes such jobs in its stride. Draw upon specialist experience and get full details of machines for your production now

ANSWER

Ultrasonics
Ltd
Westgate
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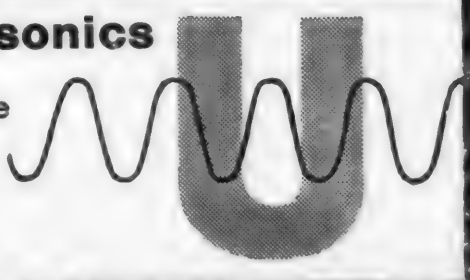
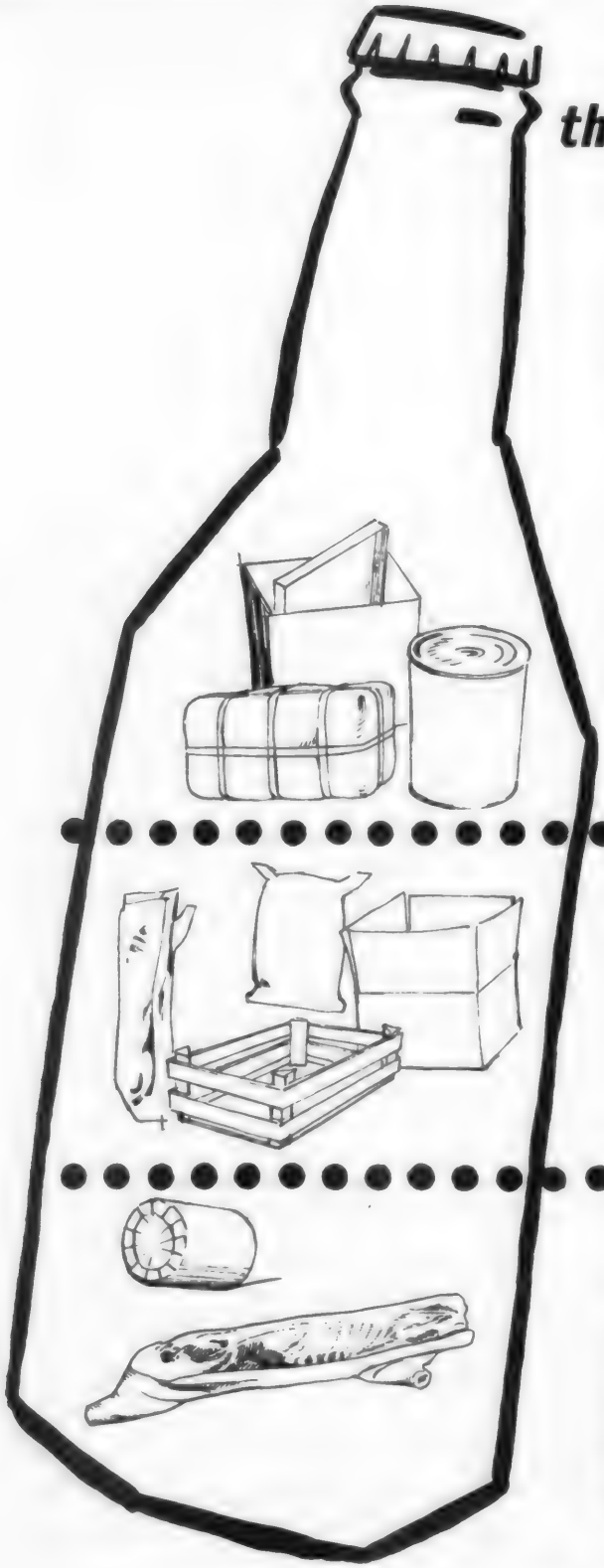
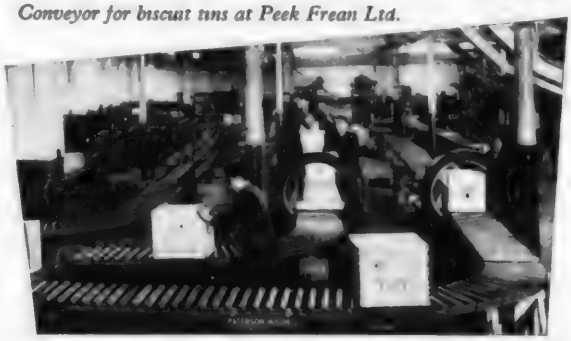




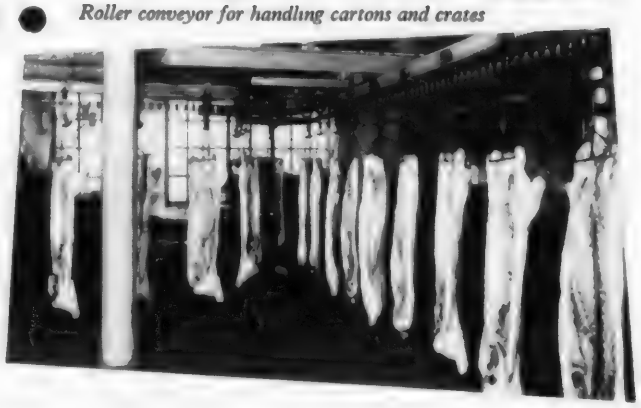
the shape of things we handle

Cars, crates and cases, bottles, bags and bacon, no matter what the product is, Paterson Hughes can supply a materials handling system specially suited to fulfil the requirements of your particular needs.

Conveyor for biscuit tins at Peek Frean Ltd.



Roller conveyor for handling cartons and crates



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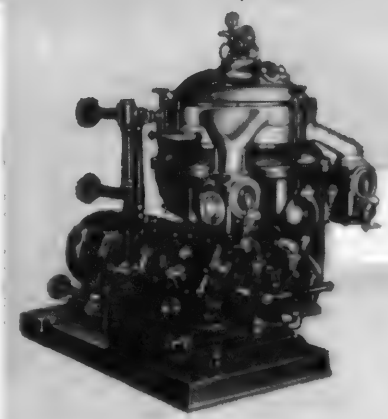
P.1497

Automatic Self-opening Centrifugal Separators

Get your process on a fully automatic system. No stopping for bowl cleaning. Automatic timing device controls the intermittent discharge of solids while the bowl is running at full speed. Manual supervision reduced to a minimum.

All this plus the fully scientific design of the De Laval disc type bowl, which gives high efficiency—high capacity centrifuging technique.



De Laval PX209-15F Purifier for oils etc.

DE LAVAL of course!

De Laval BR-PX309 Clarifier for Wort, Fruit Juice, etc. Pressure discharge for clarified liquor in a non-aerated condition.

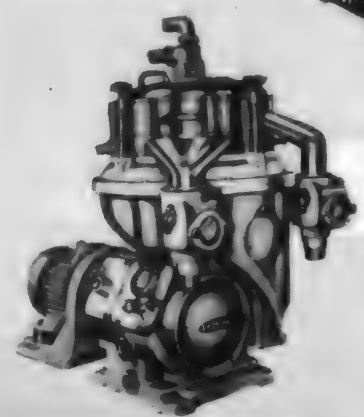
Already many hundreds of De Laval Self-Opening Machines have been sold for fuel oil purification. Other recent sales include machines for:—

CLARIFICATION of

Antibiotic liquors	*	Beer wort
Caustic liquors	*	Coffee extract
Colour dye liquors	*	Napthalene oil
Rough beer	*	Viscose etc.

SEPARATION and PURIFICATION of

Animal fats	*	Butter
Crude vegetable oils	*	Herring oil
Glue water	*	Lime juice



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Have the choice of 150 current production models.

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Broadbent high duty sugar centrifugals in a modern sugar factory.

Over 90 years experience in the specialised field of centrifuging enables us to recommend the most satisfactory equipment for increasing your production

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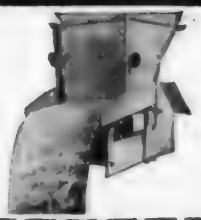
Simon vibratory VELOFEEDERS have EVERY ANSWER TO YOUR FEEDING PROBLEMS

I want feeders that will give both high and low outputs without complicated re-setting.

No problem!

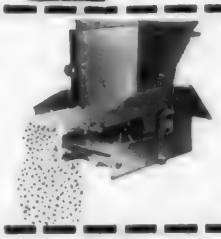
Velofeeder discharge rates can be adjusted in seconds from tons to pounds an hour within a 400-1 ratio.



I want feeders that can be relied on to maintain their output accurately.

Certainly!

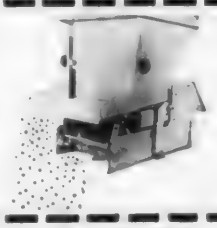
When set to a precise flow, Velofeeder output is unvarying.



I want feeders that can be reset quickly for repeat runs.

Easy!

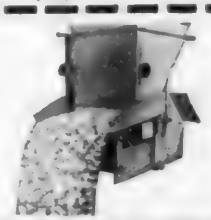
Accurate re-setting by handwheel and pointer is a Velofeeder feature.



I want feeders that will handle a diversity of materials.

Solved!

Velofeeders handle smooth or granular products, pulpy or abrasive, fine powders or 2" lumps.



I want feeders that run cheaply and quietly.

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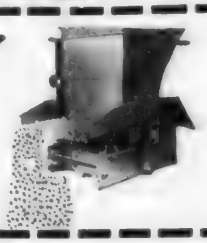

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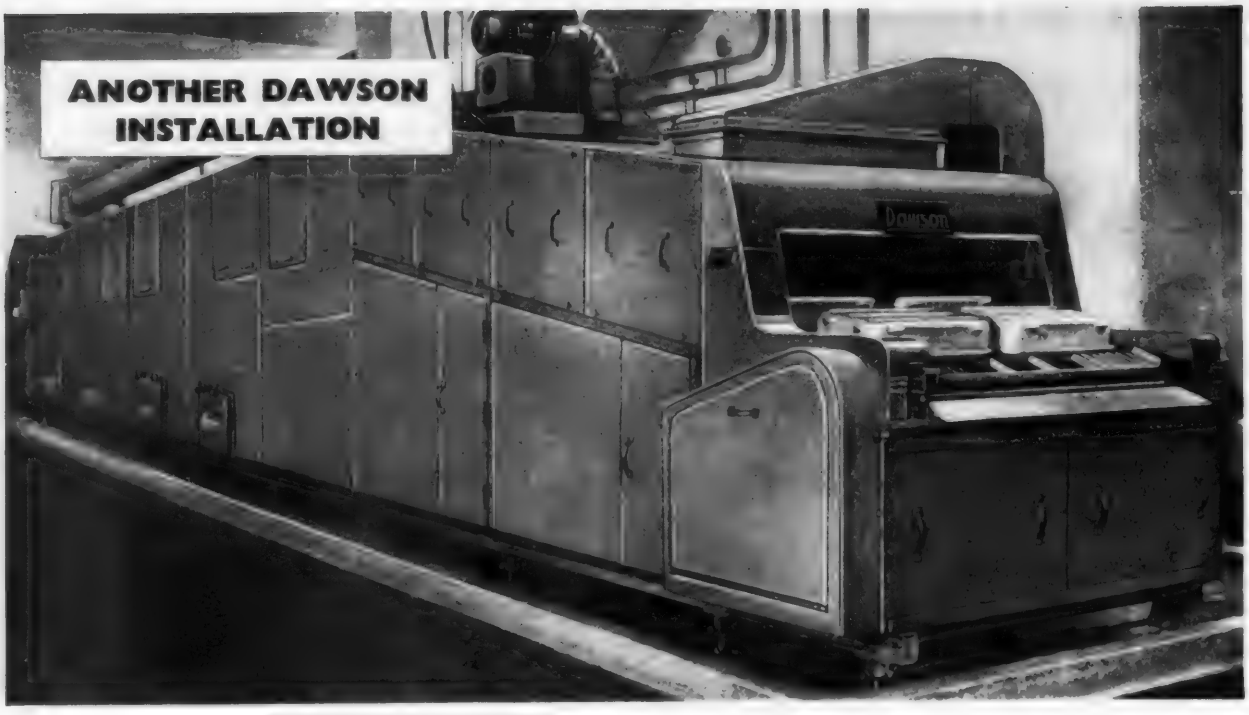

DAWSONS build many special machines for the FOOD INDUSTRY

This machine was supplied to Messrs. J. Sainsbury Ltd., London, for washing a wide variety of aluminium containers for perishable foods.

Dawson washing plant is used in every branch of the Food manufacturing industry and standard machines are available for washing trays, cans, jars, bottles, moulds, dishes.

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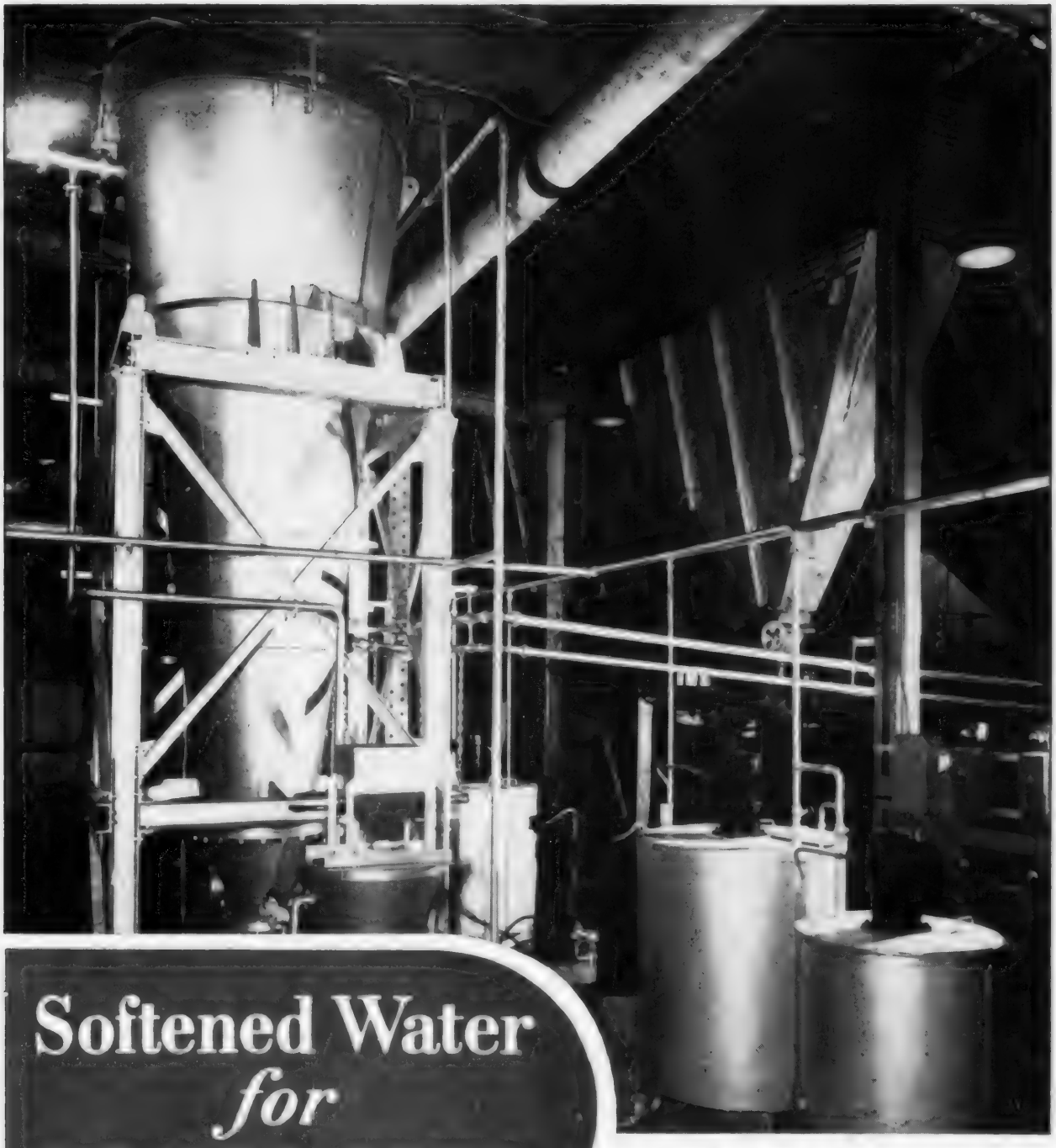

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Consistent zero-hard softened water for boiler feed is supplied by "Spiractor" cold lime softener followed by a Permutit Ion Exchange softener. This is only one of a range of Permutit plant designed to supply correctly treated boiler feed. If you require further information on Permutit boiler feed water treatment plant, please write to:—

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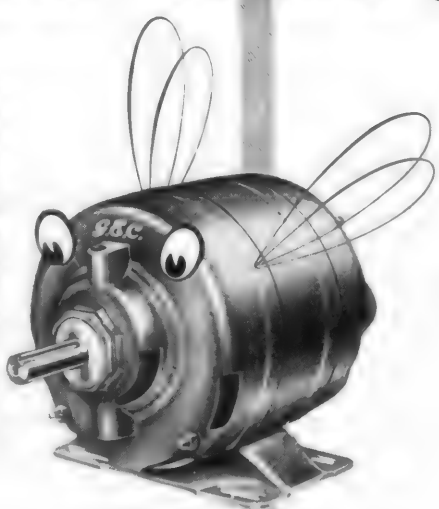

G.E.C. manufacture many types and sizes of fractional motors for light industrial and domestic drives—whether for your plant or products our engineers will always be pleased to help you choose the right motor for the job.

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It's so much easier to store.
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all packed in containers to suit your requirements.

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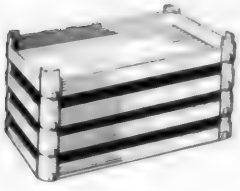

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★ Designed to meet modern hygienic standards—easy to clean. Heavy gauge aluminium tops, extruded aluminium alloy square tube legs and frame, domed shaped cast feet. Available in a wide range of lengths and widths. Many other types also offered incorporating sinks, back plates, side plates, shelves, cutting boards, adjustable feet, etc. Also 1 operator to 4 operator filleting blocks.

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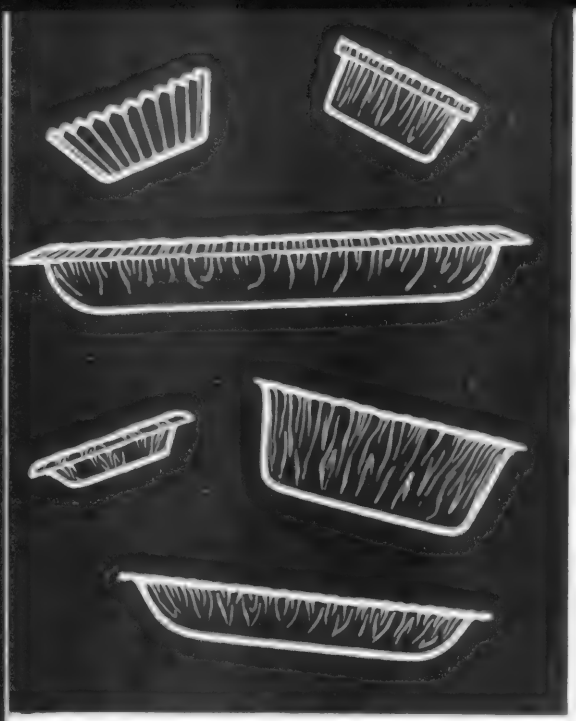

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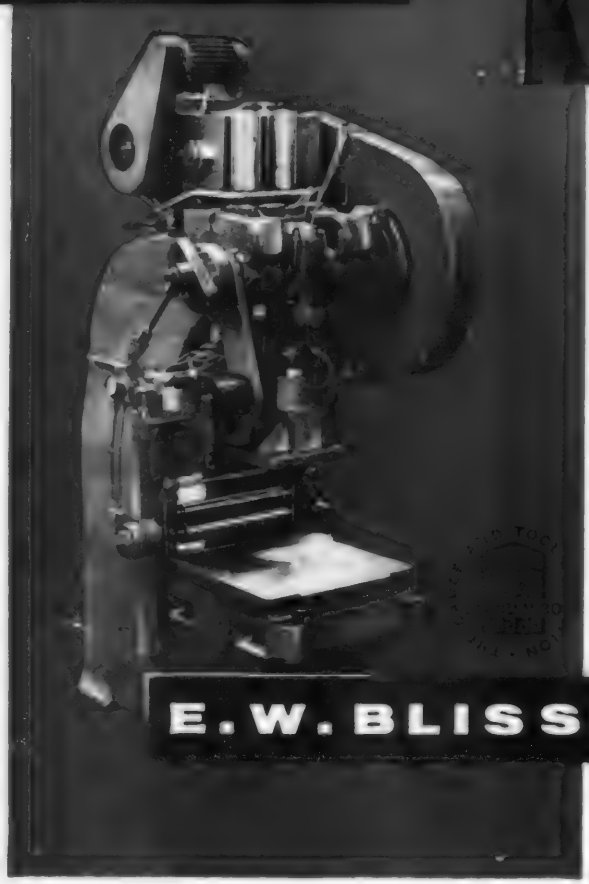

with a BLISS 12½ F FOIL PRESS

This press is especially designed for production of pie plates, cake plates and similar aluminium foil products.

Operating at speeds up to 120 strokes per minute this machine is fitted with a precision-type single roll feed mounted between the uprights allowing it to take foil directly from the coil and feed it forward across the die area.

A wide range of both large single die or smaller multiple die work is permissible.

This press will be on display at the Bliss Stand No. 30 Gauge and Tool Exhibition May 12th-21st at Olympia.

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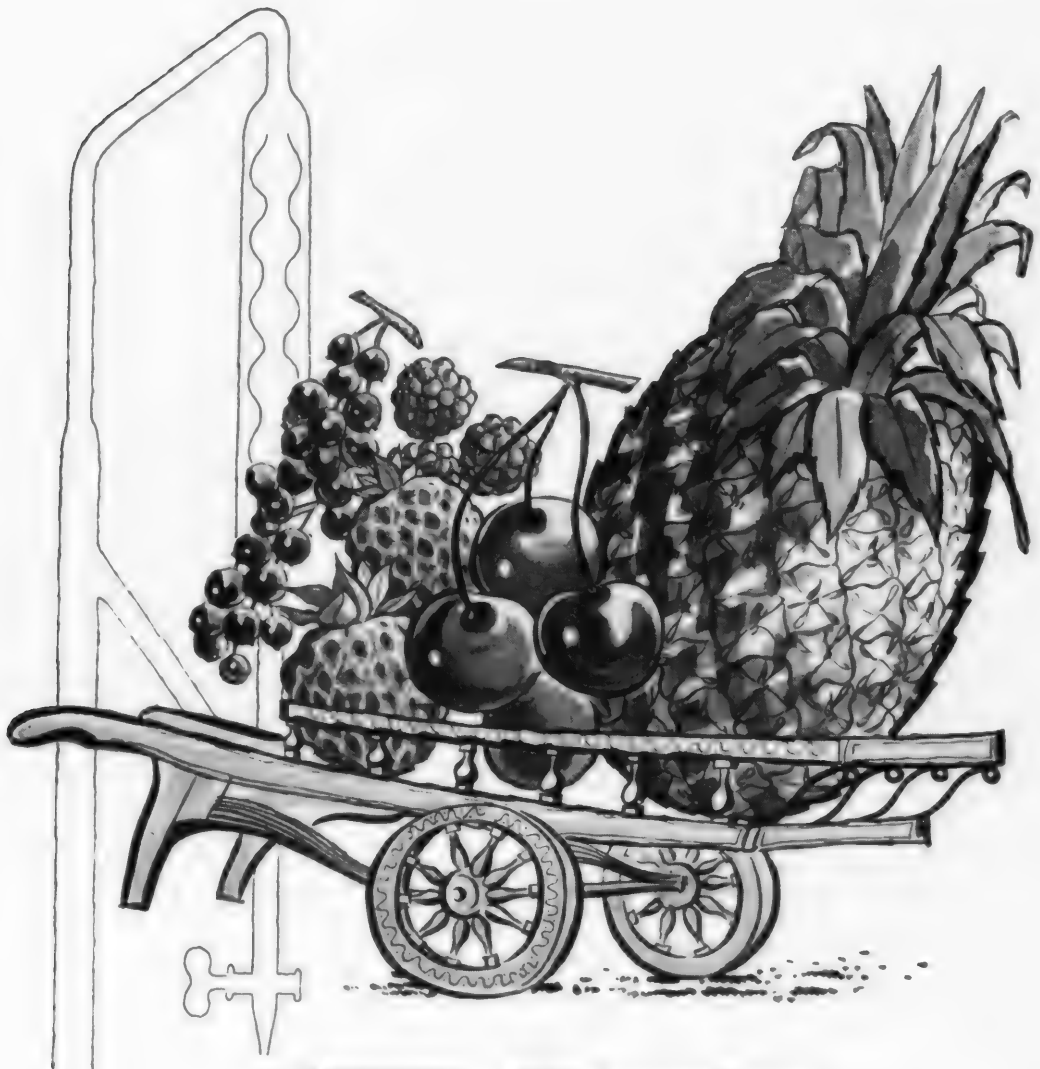

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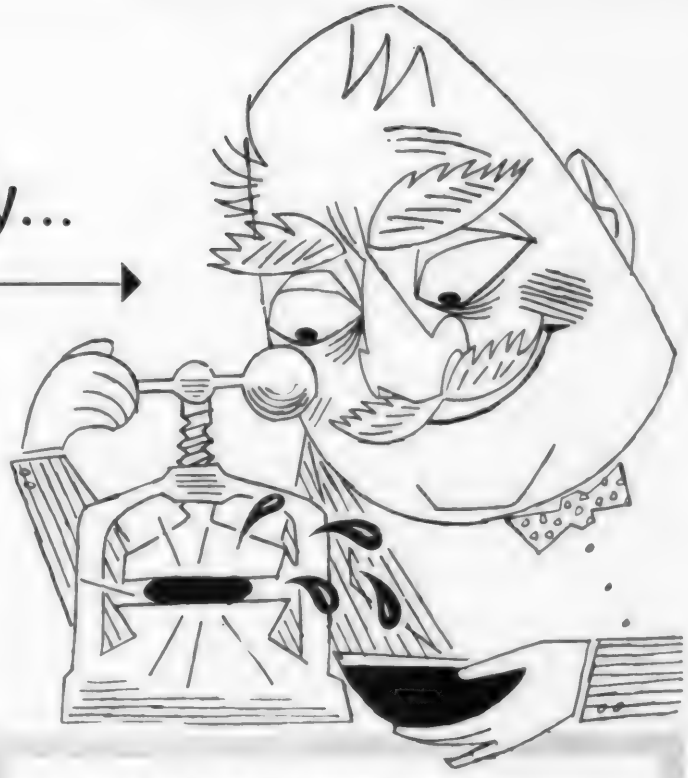
We save tons of vegetable oil every day...



Sharples Low-Loss process now in use all over the world

VEGETABLE OIL REFINERS in many different countries are saving tons of oil every day with the Sharples Low-Loss Vegetable Oil Refining Process. This really deserves its name. The savings are striking. Compared with Kettle refining 25%–40%. Compared with Caustic refining up to 15%.

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A typical Sharples Vegetable Refinery. Write for Bulletin No. 1273F for further information on this process.

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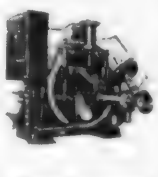

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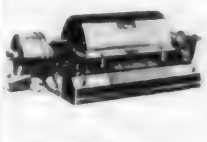

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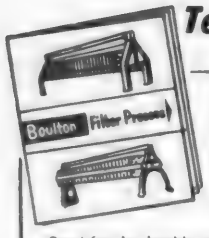

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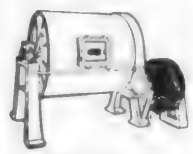

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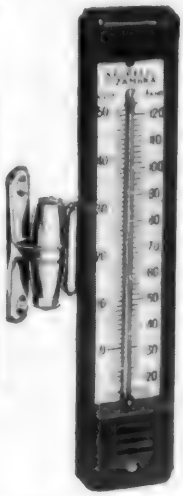

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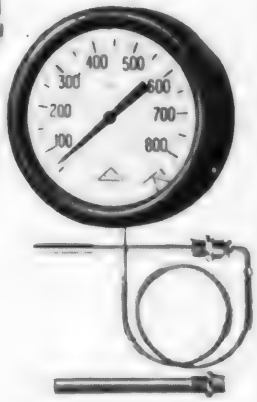
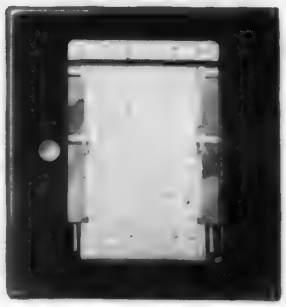


Distance-type Mercury-in-
steel Dial Thermometer



Resistance Thermometer
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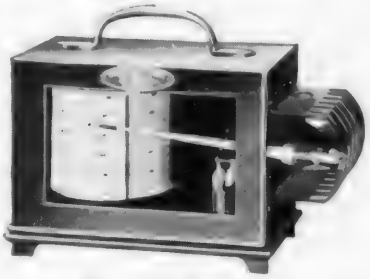

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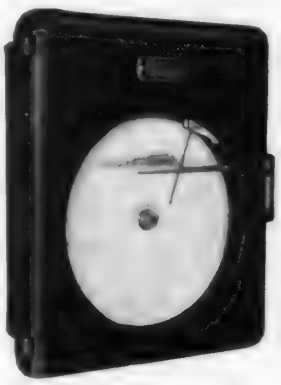

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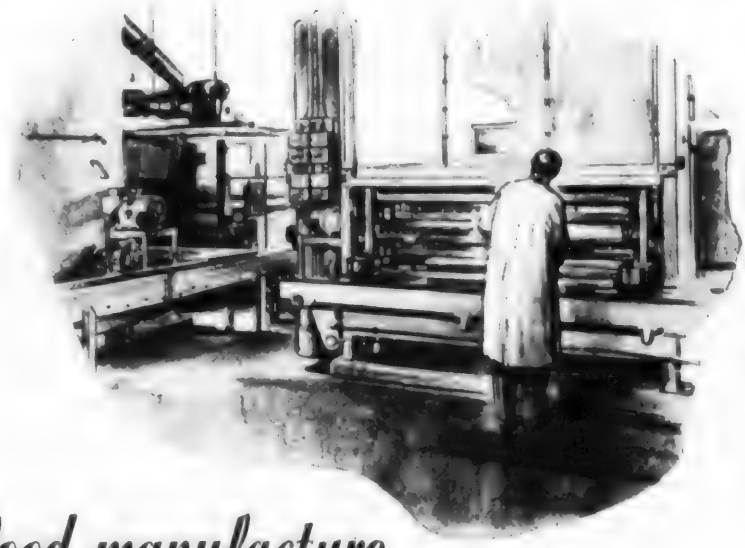

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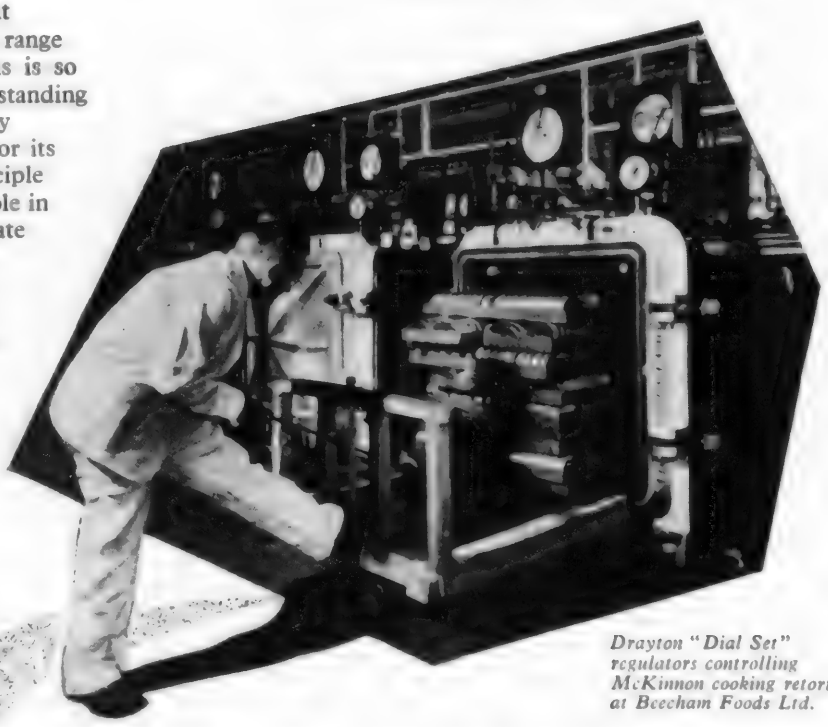

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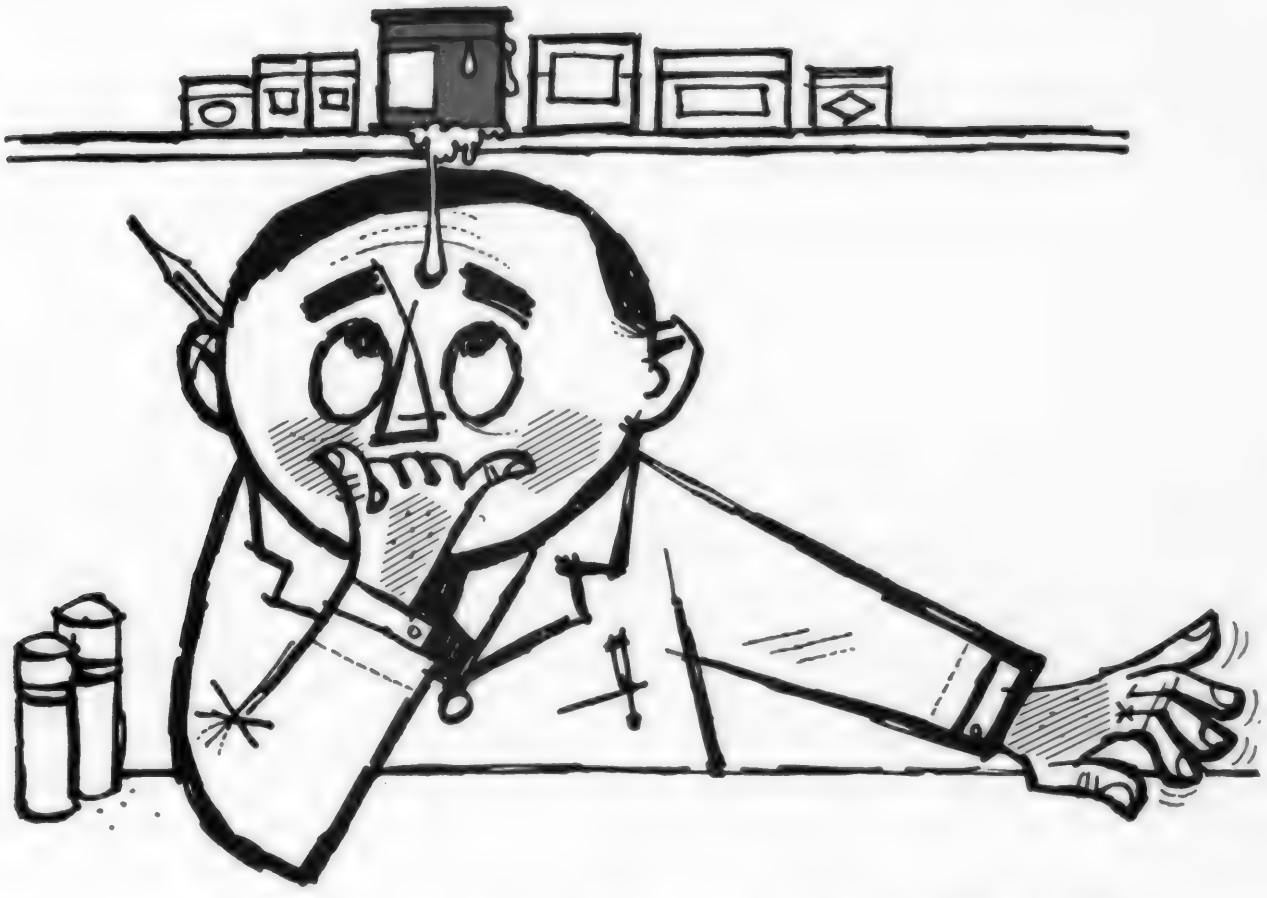

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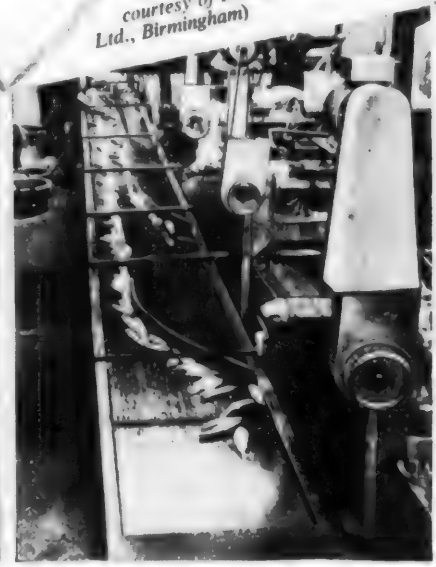
Fruit bottling on a 'Motaveyor' conveyor (by courtesy of J. Mawdsley Ltd., Wigan)



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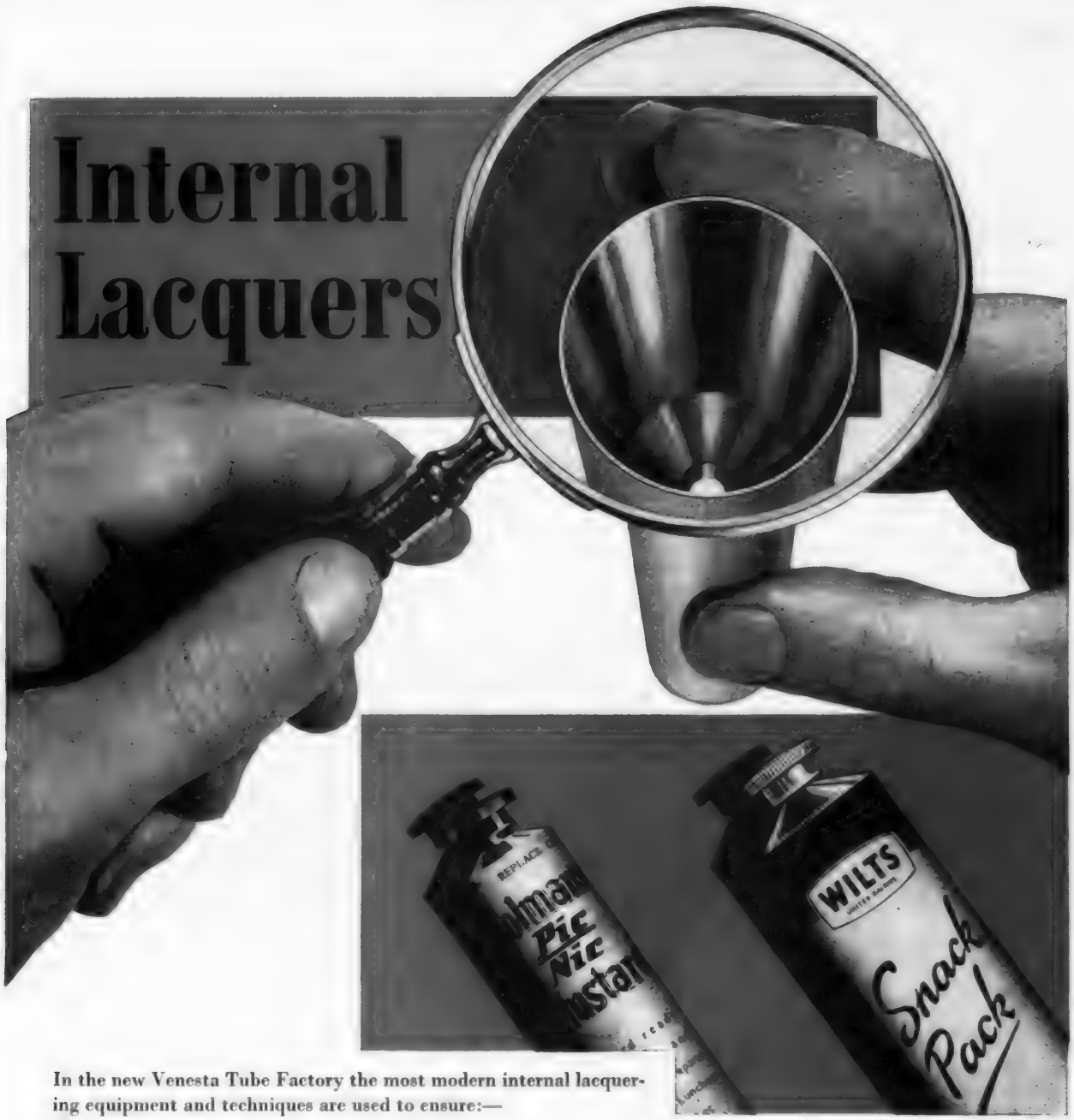

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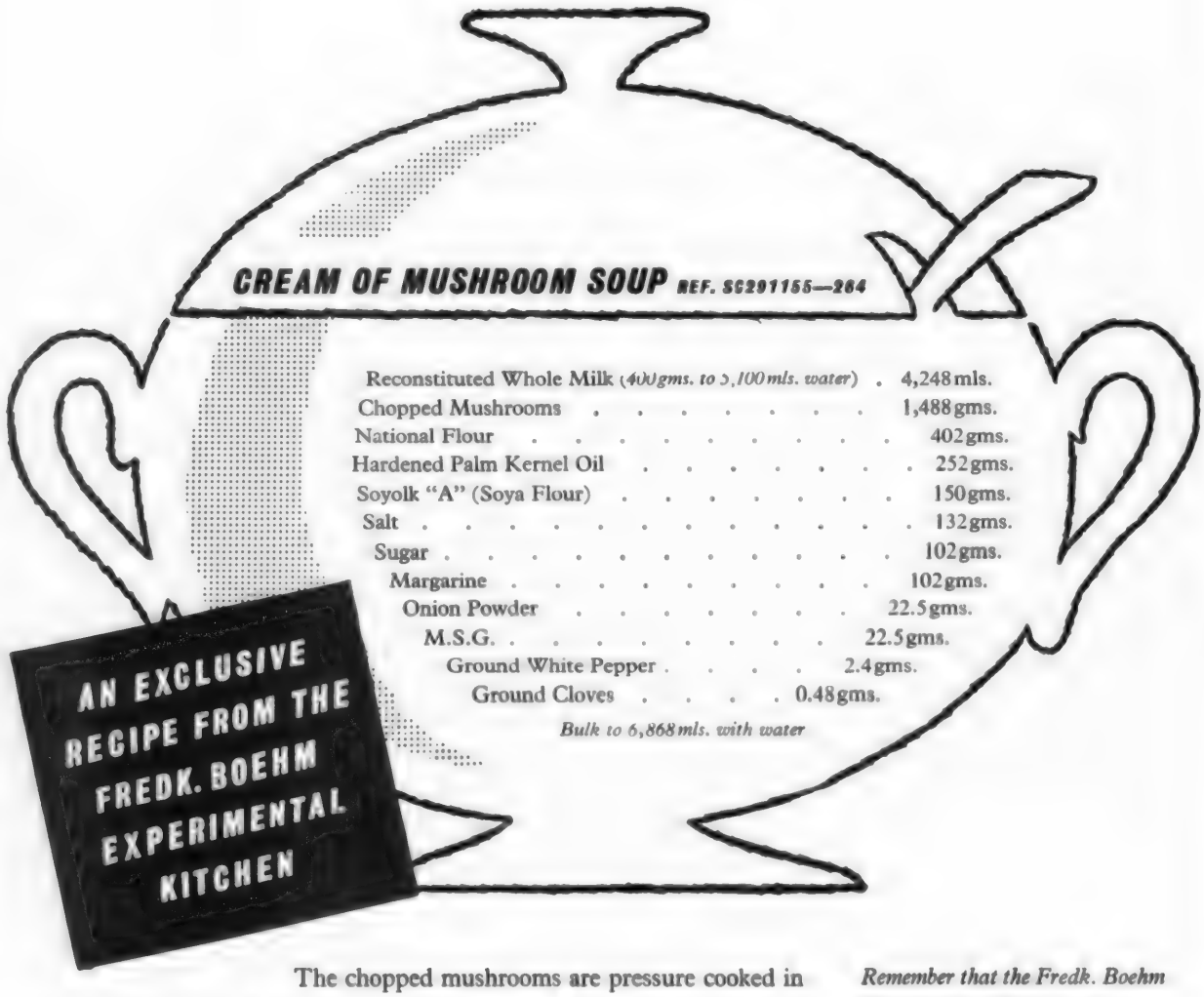
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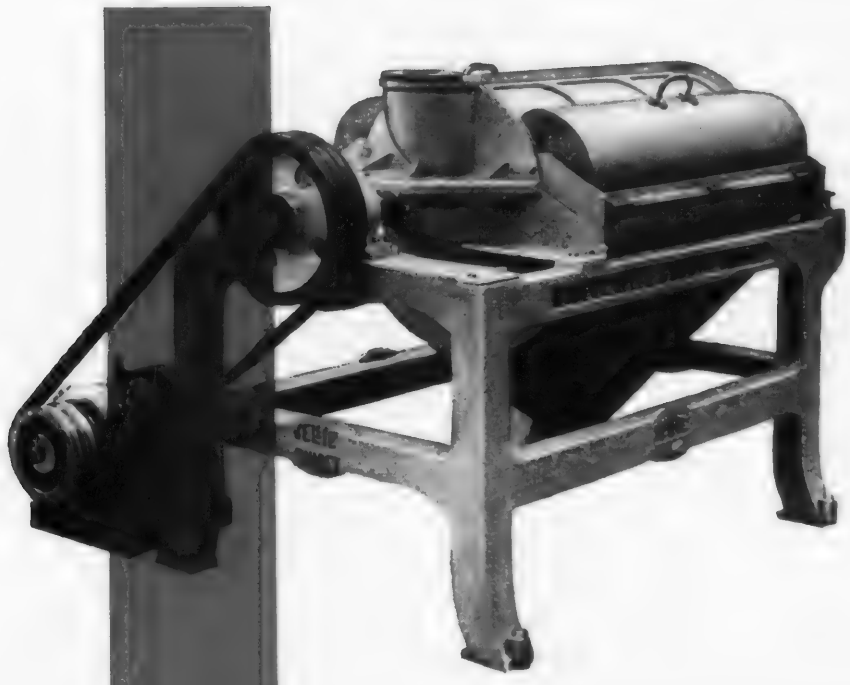

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The roughage—skins, seeds, cores and other residue is efficiently strained off. In certain cases where it is necessary to pass the seeds and some chunks into the finished products, this is effectively controlled by fitting a suitable perforated pulping screen.

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Send today for full particulars.

KELLIE for FOOD PLANT

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ROBERT KELLIE & SON LTD., DUNDEE, SCOTLAND

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A Pectin for every purpose

ELPEX

The standard Pectin. Completely starch-free, its high quality, clarity, and jel-making properties never vary.

NSF GRADE

A pectin of standard "Elpex" setting strength but specially prepared for the darker jams where maximum clarity is not essential.

XL GRADE

For specialised products such as Jelly marmalade. In colour and clarity, "X.L.Grade" replaces powdered pectins at less than half the cost.

and NOW!

LIQUID SLOW-SET PECTIN

Guaranteed setting temperature. Specially suited for 7's, 14's and bulk packs of jam where ordinary pectin causes caramelisation and pre-setting.

EVANS PECTINS

TWENTY-FIVE YEARS ago, William Evans & Co. pioneered the manufacture of Pectin in Great Britain. Their unique experience is freely available to jam makers through the Technical Advisory Service. Sample quantities for production testing will be sent on request.

WILLIAM EVANS & CO. (HEREFORD & DEVON) LTD., WIDEMARSH, HEREFORD

What is the secret of the perfect toffee?

You don't have to look through keyholes for the answer to this question, it's been an open door for years to manufacturers who rely on *NUCOCOS*.

NUCOCOS gives resistance to stickiness, candying and softening. It increases the shelf life, and gives an added quality to toffees by reason of the extra creaminess it imparts. *NUCOCOS* has been the key to successful toffee making for over half a century and has opened the door to quality production and increased sales.

Our Advisory Department is alway at your service and will be happy to provide full technical details of *NUCOCOS*.

NUCOCOS makes good toffees taste better

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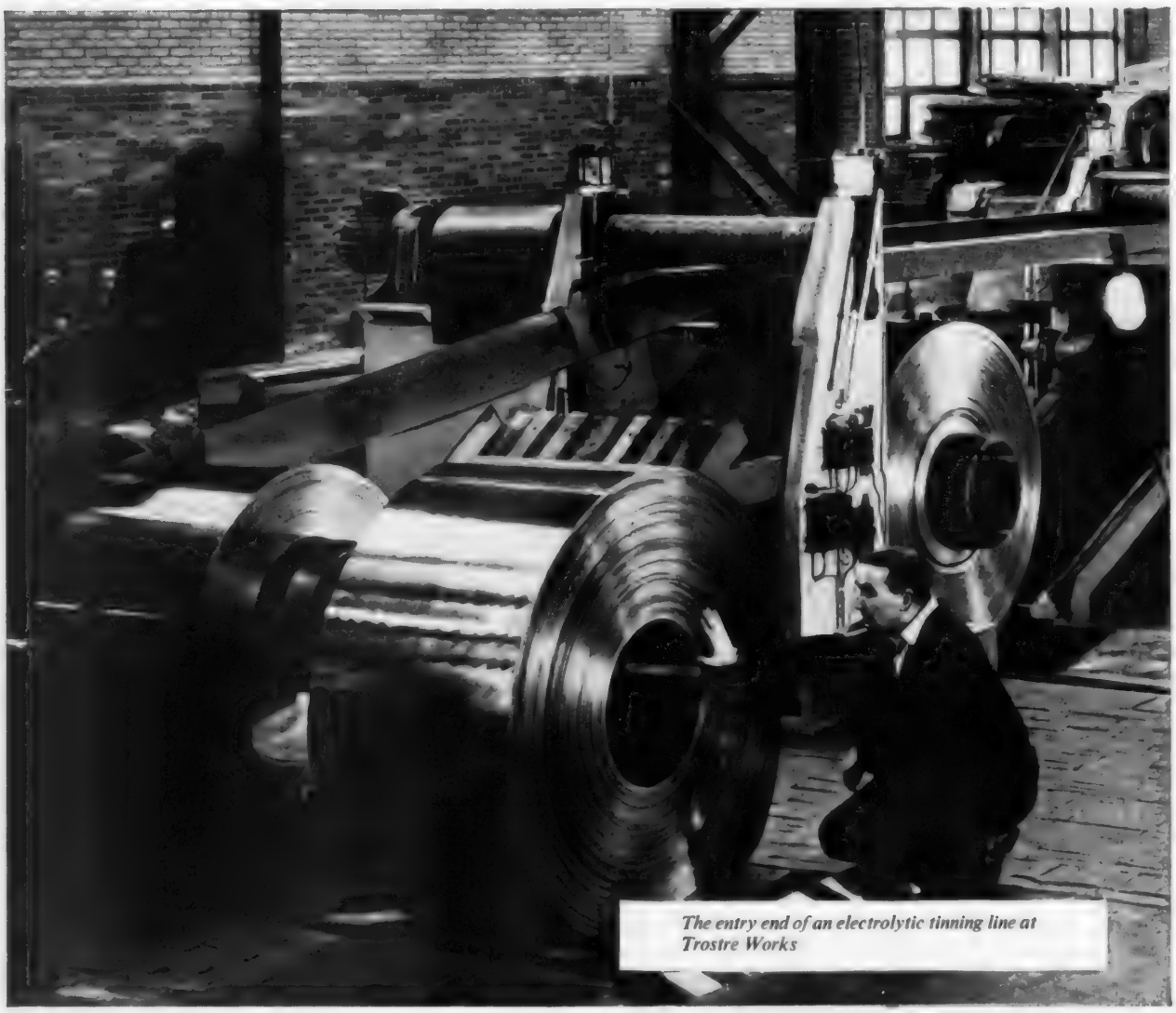
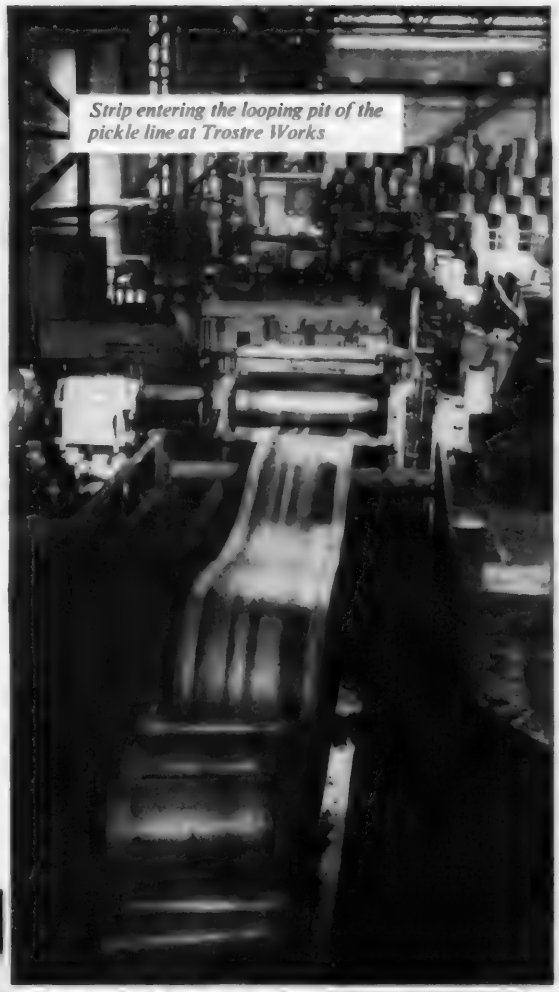
Two-thirds of Britain's TINPLATE is made by

THE STEEL COMPANY OF WALES LIMITED



The entry end of an electrolytic tinning line at Trostre Works

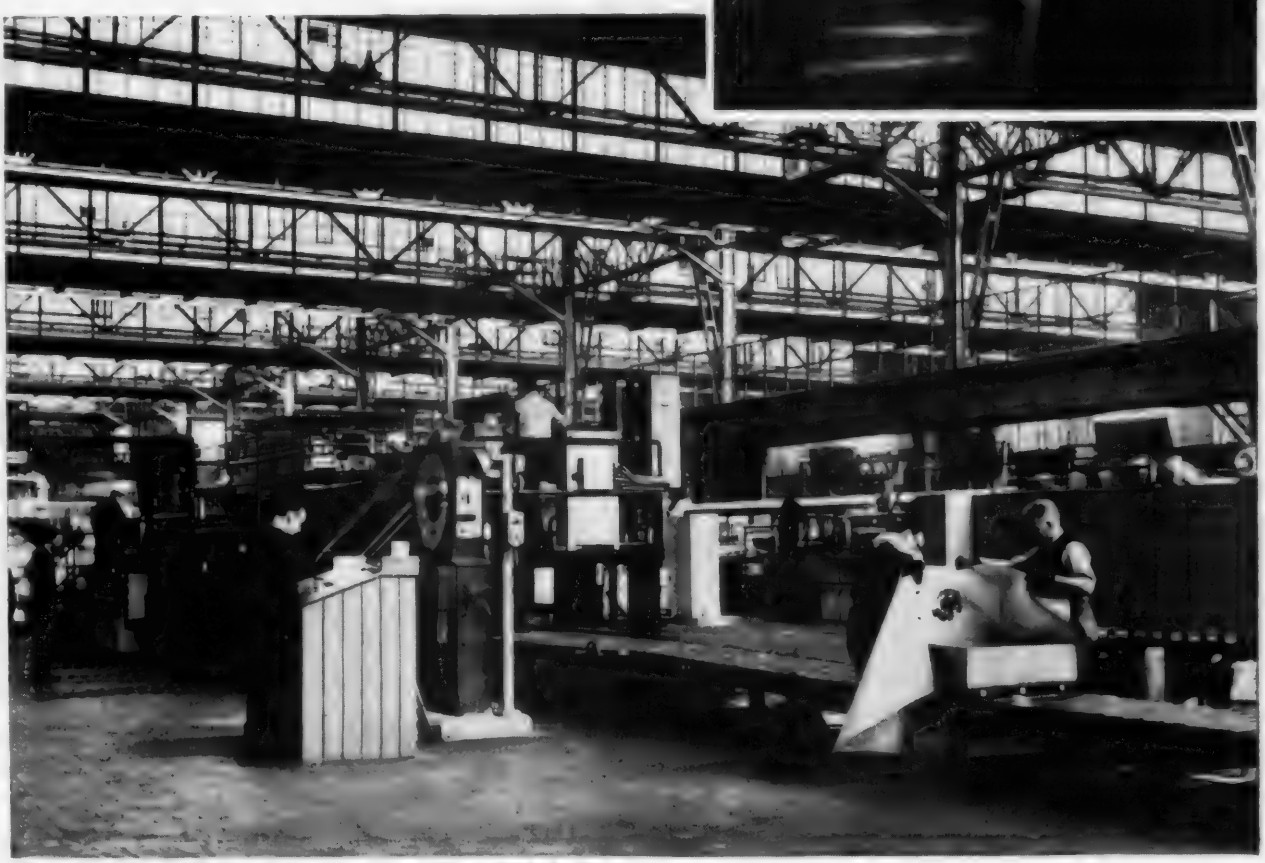
Tinned strip entering the cutting and classification section of an electrolytic tinning line



Strip entering the looping pit of the pickle line at Trostre Works

ENQUIRIES for Tinplate and Blackplate products to:

The Sales Manager, Carmarthen Road, Swansea, Glamorgan.



The exit end of one of the latest electrolytic tinning lines at Velindre Works

14 contracts

for W & R Jacob (L'pool) Ltd...

prove Colt efficiency

Thirteen installations at Liverpool and Dublin had proved, to W. & R. Jacob (L'pool) Ltd., how effectively Colt ventilation systems minimise stoppages and delays. That's why Colt were called in right at the beginning, when a new packing department was planned. For this, the fourteenth contract, Colt recommended a system of positive ventilation . . . comprising 9 Colt CO2046 Extractors which exhaust the peak summer heat load of 125,000 B.Th.U's per hour together with Colt Inflow Units to give fresh air inlet and refreshing, draught-free movement of air.

Both types of ventilator were installed by Colt in the glazing without structural reinforcement. And now, the fully controllable ventilation system

ensures fresh and temperate working conditions all-year-round.

Take advantage of the vast practical experience gained by Colt through the successful solution of similar problems for over 10,500 industrial organisations. Their technical staff can always be called upon to adapt this knowledge to your specific requirements. Let Colt solve YOUR problems.

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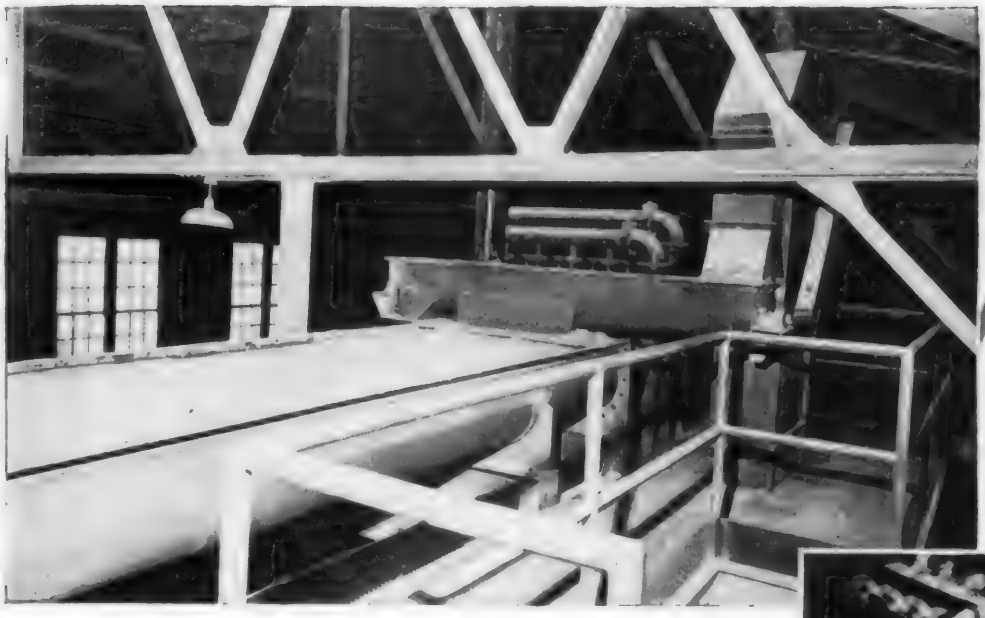
G1335

The 'HOLO-FLITE' PROCESSOR

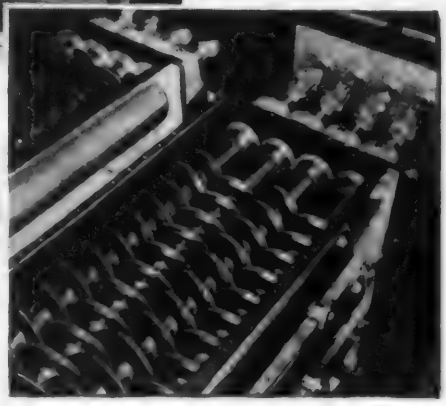


'Syncro-Screws' completely immersed in material being processed.

-the space saving Heat Exchanger

The 'Holo-Flite' Processor is a screw conveyor with helical, hollow flights through which the heat transfer agent is circulated. The material to be heated, cooled or dried moves at a uniform, predetermined rate.

For full details please write for a copy of Publication No. PP56-2.



Hollow, intermeshing 'Syncro-Screws' transport and heat or cool the material being processed.

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The Scott-Rietz Angle Disintegrator is designed to give uniform fine grinding with instantaneous homogenizing and is particularly suitable for baby foods, potted meats, fish pastes, vegetable purées, tomato and fruit juices. Built to the highest standards of hygiene, all contact parts are of stainless steel and can be rapidly dismantled for cleaning.

The machine operates at high speed and is fitted with a full 360° screen giving uniform fine grinding and constant particle size. The exclusive Scott-Rietz Differential Discharge can be fitted to separate waste materials from the primary product. Special belt drive provides for change in speed and oil-mist lubrication can be provided if required. Scott-Rietz Disintegrators can be supplied in three sizes with rotor diameters of 6 in, 8 in, and 12 in.

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CHEMICAL & PETROLEUM ENGINEERING EXHIBITION
OLYMPIA London 18-28 JUNE 1958

Please write for Bulletin No. 119 which gives details of Scott-Rietz Food Processing Equipment.

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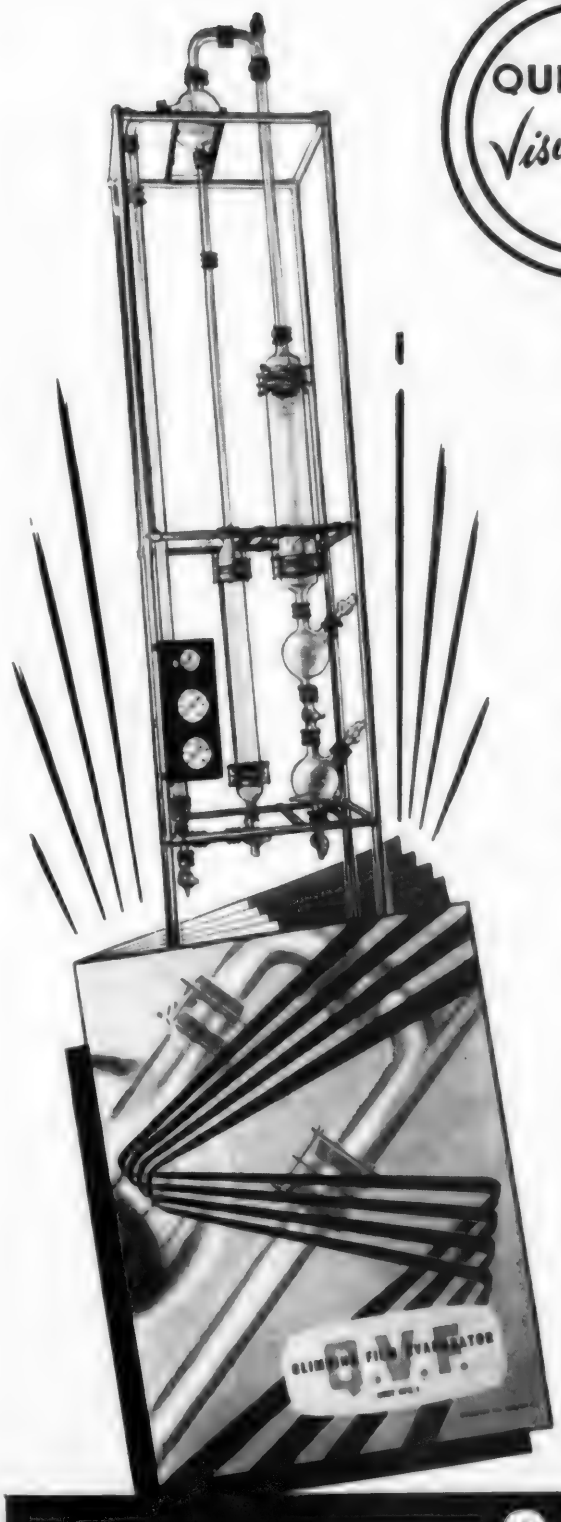
ONE OF THE BALFOUR GROUP OF COMPANIES SR7



QUICKFIT *Visible Flow*

Evaporation Equipment in GLASS

For Cleanliness
Visibility
Freedom from Corrosion

Experience over many years of manufacture and a constant study of working conditions has shown that glass evaporation equipment may be used with confidence to handle the extraction of vapour from materials such as milk products and fruit juices.

Our new Brochure 'CLIMBING FILM EVAPORATORS' fully describes the equipment. Write for your copy NOW! Also available is our complete plant catalogue 'INDUSTRIAL PLANT IN GLASS' and Q.V.F. Pipeline Catalogue.

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The Chemical Engineers in Glass

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TEL: LONGTON STAFFS 32104 GRAMS: GLASSPLANT · STAFFS

Refrigerated food display cabinets lined and faced with 'Darvic' p.v.c. and made by The Bedford Refrigeration Co. Ltd., Bedford, for the Peterborough & District Co-operative Society, Ltd., Butcher's Shop, Peterborough.

Wherever there's a refrigerated food display there's a need for 'Darvic'

The Butchery Department of Peterborough & District Co-operative Society Ltd., has its refrigerated food display cabinets lined and faced with 'Darvic' p.v.c. sheet. There were so many reasons for choosing 'Darvic'. To start with, it will not taint food or drink and it is completely odourless and hygienic. 'Darvic' is light, tough, easy to shape and even in thin sheets has considerable rigidity.

Furthermore, 'Darvic' can be used in one-piece shapings for complete refrigerator interiors. High impact strength, resistance to corrosion and low thermal conductivity give it a great advantage over conventional materials.

Crisper trays and other components are readily shaped in attractive colours and the colour range includes multi-colour laminates.

'DARVIC'

'Darvic' is the registered trade mark for the rigid p.v.c. sheet made by I.C.I.

ICI IMPERIAL CHEMICAL INDUSTRIES LIMITED · LONDON · S.W.1

PD.42

ASK THE MEN WHO USE THE NEW

THAMES Traders!

with 4 and 6 CYLINDER DIESEL AND PETROL ENGINES

They will tell you that these advantages put the

*NEW THAMES '5-STAR' RANGE

far ahead of all-comers!

● COMPLETELY FORWARD CONTROL — extra loadspace . . . extra earning capacity . . . stronger, tougher, longer-lasting, more manoeuvrable . . . ALL FOR *LESS* OVERALL LENGTH!

● NEW BUSINESS-LIKE STYLING — new cab comfort . . . better insulation . . . bigger, roomier, safer . . . excellent front and rear visibility with the biggest, one-piece, curved windscreen ever!

● NEW ENGINE AND TRANSMISSION LAYOUT — extra strong silent synchro-mesh gearbox . . . open drive shaft . . . banjo-type hypoid rear axle . . . powerful brakes and synchronised springing . . . plus a host of brilliant new features for extra power, extra performance, longer life and easier maintenance.

● THE BEST EVER DIESEL OR PETROL OPTION is now yours with the new Thames Traders:—

4-Cylinder Diesel Engine OR **4-Cylinder Petrol Engine**	*for 30 cwt. 2, 3, 4 and 5 ton trucks*
***NEW* 6-Cylinder Diesel Engine** OR ***NEW* 6-Cylinder Petrol Engine**	*for 4, 5 and 7 ton trucks 4½, 5 and 6 cu. yd. Tippers*

● PLUS an extensive range of optional factory-fitted equipment . . .

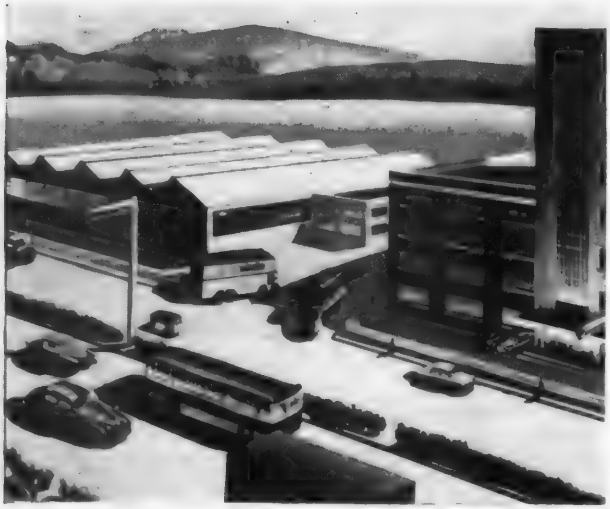
and FORD SERVICE, too!

SEE YOUR DEALER FOR FULL DETAILS AND PRICES

They're FORD Winners!

***The introduction of Thames Forward Control Traders does not affect availability of Thames semi-forward control trucks. This established range of vehicles (up to 4 tonners with 4-cyl. Petrol and Diesel alternatives) is still in full production and available from your Dealer.**

FORD MOTOR COMPANY LIMITED · DAGENHAM



SPACE

FOR GROWING INDUSTRIES

Is your factory old, inconvenient, too small, its lease running out?

Are you short of workers, and are those you have badly housed, tired of long journeys and loss of time whenever there is a traffic hold-up?

HAVERHILL or THETFORD

SUFFOLK NORFOLK

OFFER YOU

- SITES for FACTORIES with all services
- NEW HOUSES for your workers
- LABOUR available through a selective recruitment scheme

WHAT ARE YOUR DIFFICULTIES?

Disposing of your existing premises? Lack of sufficient capital for new building?

PERHAPS WE CAN HELP OR ADVISE YOU!

The London County Council in co-operation with these towns has set up an Industrial Centre at the County Hall, S.E.1, to deal with London industrialists. Write (ref. VA G 10) or telephone for more information or an appointment—WATerloo 5000, Extension 7494 and 7595.

C.P - *Sellers*

HYDRAULIC JET CLEANERS

reach and clean where nothing else will

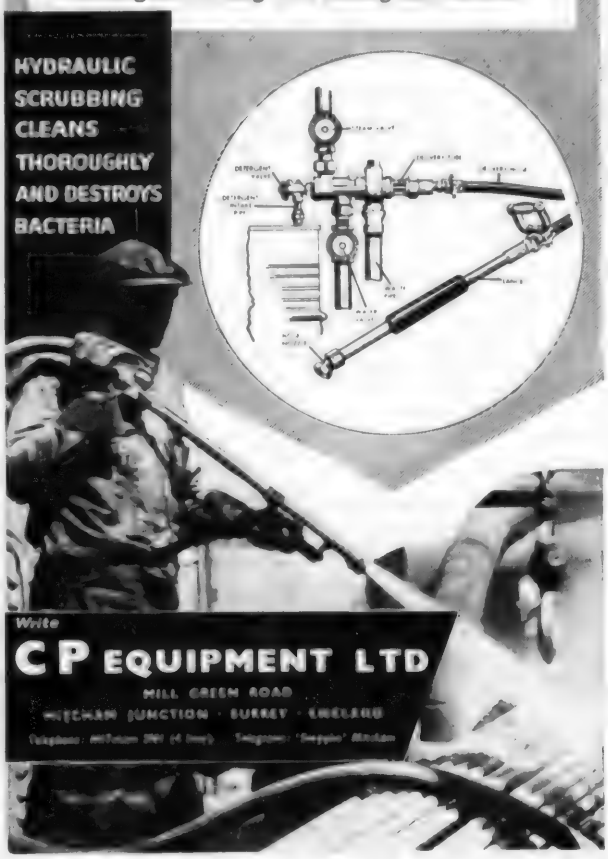
C.P-Sellers units with adequate cold water and steam of not less than 40 lbs p.s.i. eliminate every cleaning problem.

The impact and hydraulic scrubbing action completely removes dirt, grease and soil from walls, floors and machinery. When required detergents can be metered economically.

The C.P-Sellers Rotor Jet cleans the inside of tanks completely, safely . . . automatically discharging at high pressure — hot or cold water with or without solvents or detergents.

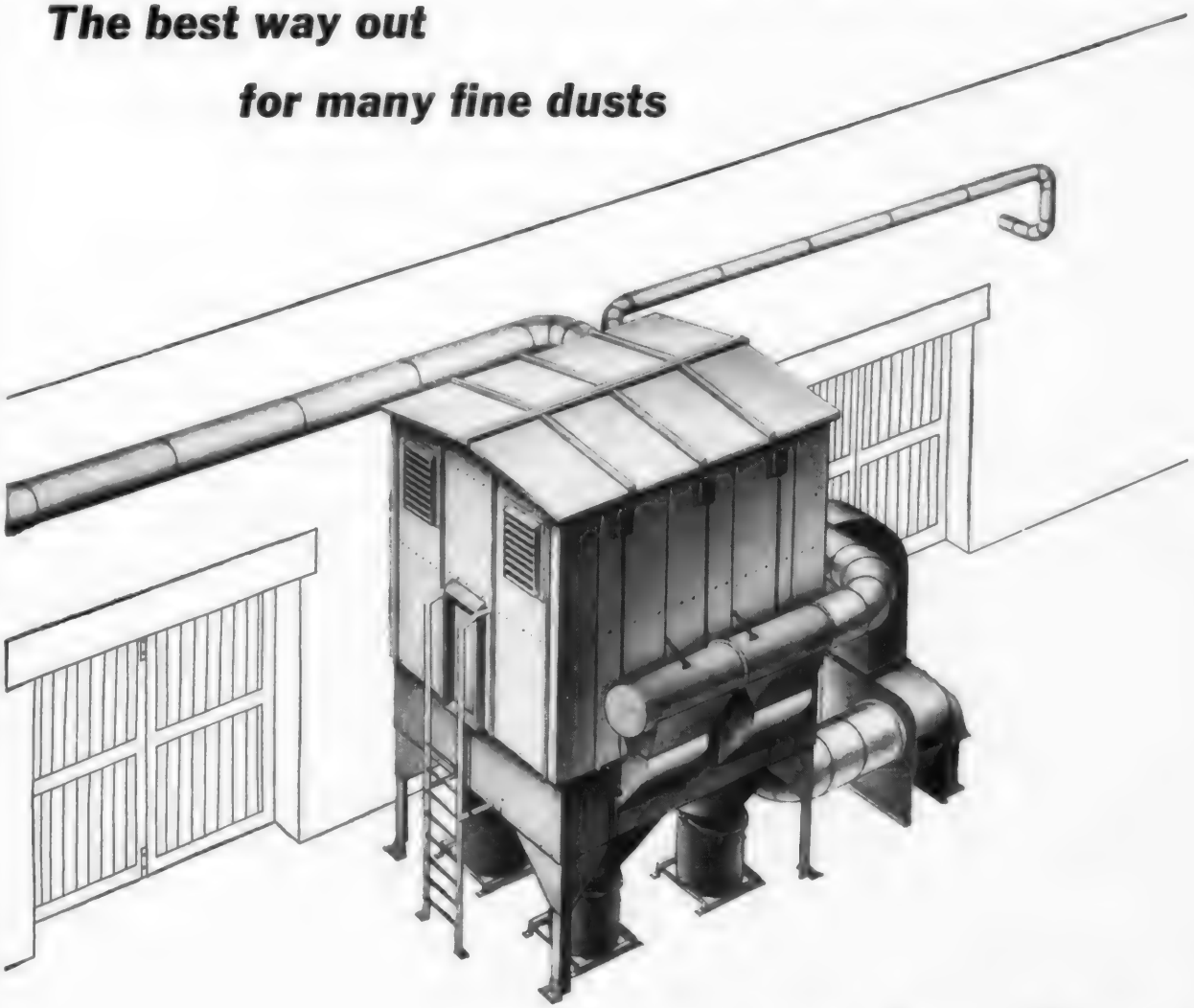
Get the facts from the leading heavy duty cleaning equipment manufacturer.

Also specialists in continuous and batch processing plant and equipment for controlled heating and cooling with mixing and aeration.



We call it a Drytube Filter. It's designed to collect fine, dry dusts and particularly recommended where you want to reclaim the dust. It's highly efficient, costs little to maintain, and allows for quick and easy dust disposal. We make it in three versions with a standard range of sizes, using canvas bags, quick release bins or worm conveyors to handle the collected dust. Mind you, Drytube Filters are only one side of our business. We make a range of other collectors —from the smaller units like the Dustmaster right up to complete plant installations. See us for dust and see if we can settle it.

The best way out for many fine dusts



see us for dust

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DUST CONTROL EQUIPMENT FOR INDUSTRY

There's a resident Dallow Lambert man in your area.

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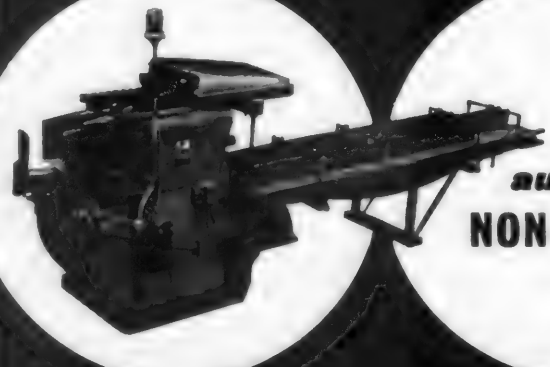
a completely new method of casing cans

The model 3 FMC Non-Shock Caser introduces a completely new method of casing cans. It cuts casing costs through automatic, high speed operation. Simply slip case over chute and the caser does the rest. Speeds up to 1,200 cases per hour in 3×4 or 4×6 pack.

Bead-to-bead contact eliminates can damage

Cans enter the caser upright, move smoothly along woven wire belt and are gently cased. No rolling - no impacts.



***fmc high speed automatic* NON-SHOCK CASER**

VARLEY-FMC LTD

(Incorporating Charles E. Douglas & Co. Ltd.)

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Don't let food pests eat into YOUR pocket...

control them with PYBUTHRIN Insecticides

TONS of foodstuffs are condemned, millions of pounds wasted annually, because of the inroads made by food pests. Don't let insect pests waste *your* money. There is a Cooper "Pybuthrin" Insecticide to control them. "Pybuthrin", which contains African pyrethrum synergised with piperonyl butoxide, is the basis of these insecticides. They are deadly to insects, prevent the building up of infestations wherever food is stored and processed but, at the same time, are non-poisonous and completely safe in use. If you have an insect problem on *your* hands, consult Cooper's. Write for free advice and details of "Pybuthrin" insecticides!

It's death to the Cacao moth

The Cacao Moth (*Ephestia elutella*), which attacks cocoa beans, dried fruit, chocolate, etc., can be successfully controlled by space spraying with "Pybuthrin" Insecticide No. 44. Normal rate of application: ½ pt. to 15,000 cubic feet for space spraying.

PYBUTHRIN

REGD. TRADE MARK

● *A COOPER PRODUCT*

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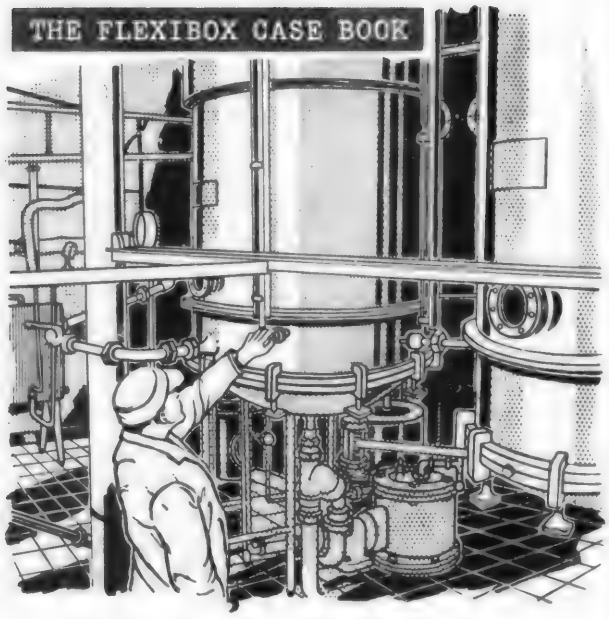

Proved leak-free
pump glands

ON CONDENSED MILK SERVICE

with **flexibox**
mechanical seals

One of Britain's most modern creameries—Felin Fach, operated by the Milk Marketing Board—has now standardised on Flexibox Mechanical Seals fitted to Howard 'M' type positive rotary pumps employed on condensed milk service.

The process involves removal of 45/50% solids under a vacuum of 26″/27″. Serious frothing trouble caused by gland leakage was effectively overcome by fitting Flexibox seals. Leak-free operation now permits the viscous product to be discharged *without* variation in vacuum.

Since fitting these unique seals, shaft scoring has been completely eliminated. In addition the whole system can now be sterilised as a matter of daily routine.

Full technical information from:

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Associated companies in the U.S.A., France and Germany
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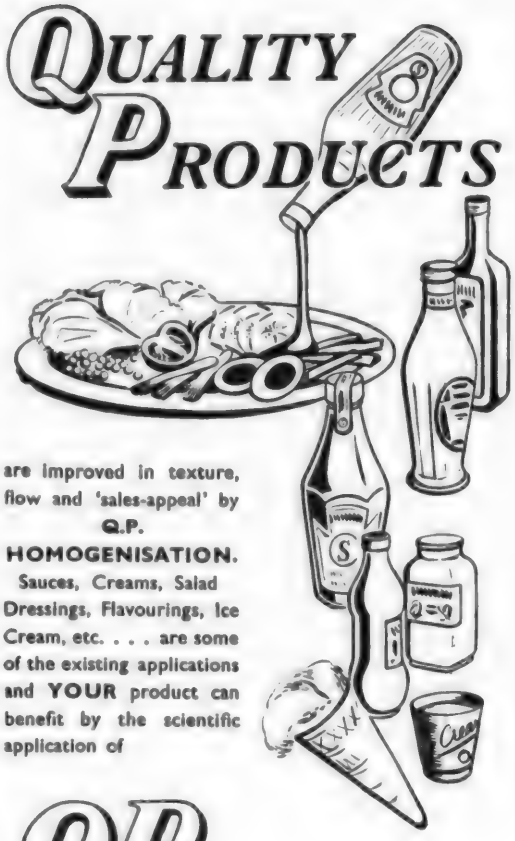

are improved in texture, flow and 'sales-appeal' by
Q.P.
HOMOGENISATION.
Sauces, Creams, Salad Dressings, Flavourings, Ice Cream, etc. . . . are some of the existing applications and **YOUR** product can benefit by the scientific application of

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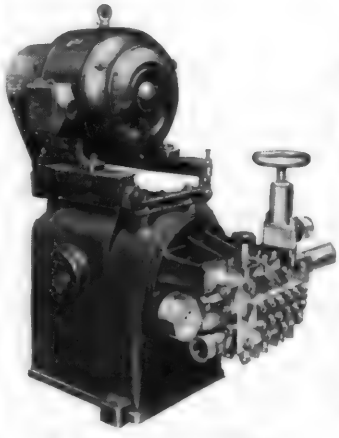
HOMOGENISERS



QP SIZE 4 HOMOGENISER

We shall be pleased to advise which of the many models we make —In 28 variations giving outputs from 10 to 300 g.p.h.—will be most suitable for your needs.

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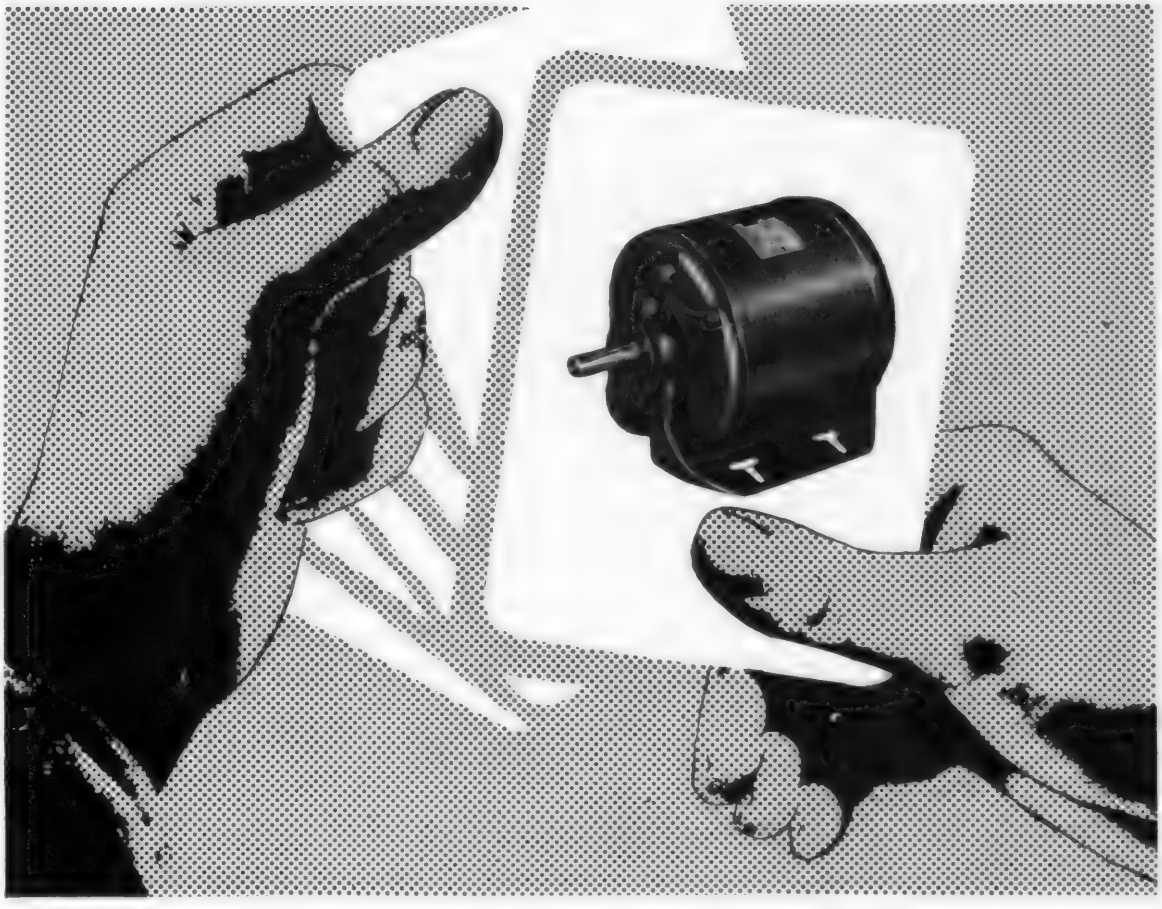

An entirely new suit in F.H.P. motors

You cannot interfere with a production line every time a new idea or a possible improvement to the product turns up. You have to let these ideas accumulate and then, in one clean sweep, incorporate the lot—or as many as are compatible—in a new design.

That is what has just happened to Crompton Parkinson F.H.P. motors. The new Series 'T' is the result of such an accumulation of experience, ideas, possibilities suggested by new materials, and so forth, that has been building up for years. The new motors are better looking, better ventilated and, if possible, even more reliable than their very popular predecessors.

Here are some of their points:—

1. Strength Rolled steel welded carcase supported by continuous full core diameter; short, stout endshields of extremely rigid design.

2. Squirrel Cage Rotor Cast under closely controlled conditions with subsequent heat treatment resulting in maximum torques and uniformity in performance.

3. Centrifugal Gear and D.C. Switch Completely new long-life design with minimum number of working parts; robust, quiet, positive and troublefree in operation.

4. Bearings 'Marathon' Mark III Bearings. These contain enough oil absorbed in felt specially made for the job, for two years running under normal operating conditions.

5. Cool Running A new system of ventilation with a fan at both ends of the motor gives the maximum airflow over the windings with a minimum of noise, and keeps the motor temperature low.

Write for full particulars to:

Crompton Parkinson
LIMITED

Member of the Nuclear Power Consortium:
ATOMIC POWER CONSTRUCTIONS LTD.

MAKERS OF ELECTRIC MOTORS OF ALL KINDS · ALTERNATORS AND GENERATORS INSTRUMENTS · SWITCHGEAR · B.E.T. TRANSFORMERS · CABLES · CEILING FANS LAMPS · LIGHTING EQUIPMENT · BATTERIES · STUD WELDING EQUIPMENT TRACTION EQUIPMENT

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Pulmac

PULVERISING MILLS
for
FINE GRINDING

- 4 sizes: Laboratory, P.1, P.2 (illustrated) and P.4
- Finest powder in one through-put.
- Granulation or 200 mesh, without sieving (down to 350 mesh with sieve)
- Test Mill available for customer's samples.
- Supplied with or without electrical and bagging equipment.

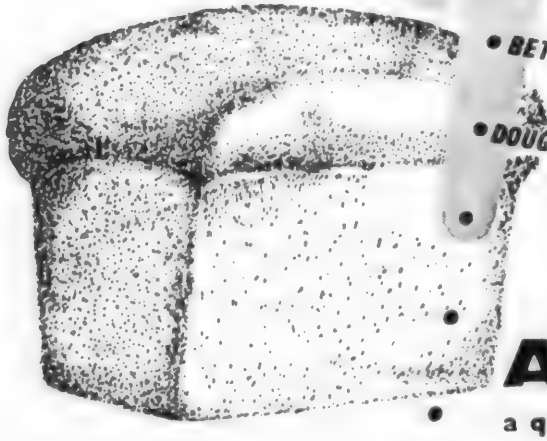
NOW MANUFACTURED AND SOLD BY

Follsain-Wycliffe
FOUNDRIES LTD.

FOLLSAIN-WYCLIFFE FOUNDRIES LTD · LUTTERWORTH · Nr. RUGBY Tel.: Lutterworth 10, 60 and 152 Grams: "Wycliffe," Lutterworth

Everything points to a BETTER loaf

- NO CRUMB STICKINESS
- BETTER SLICING PROPERTIES
- IMPROVED GASSING
- WHITER CRUMB - SOFTER TEXTURE
- BETTER CRUST COLOUR
- DOUGH WITH IDEAL HANDLING QUALITIES



Amylozyme B

a quality product of

NORMAN EVANS AND RAIS LTD

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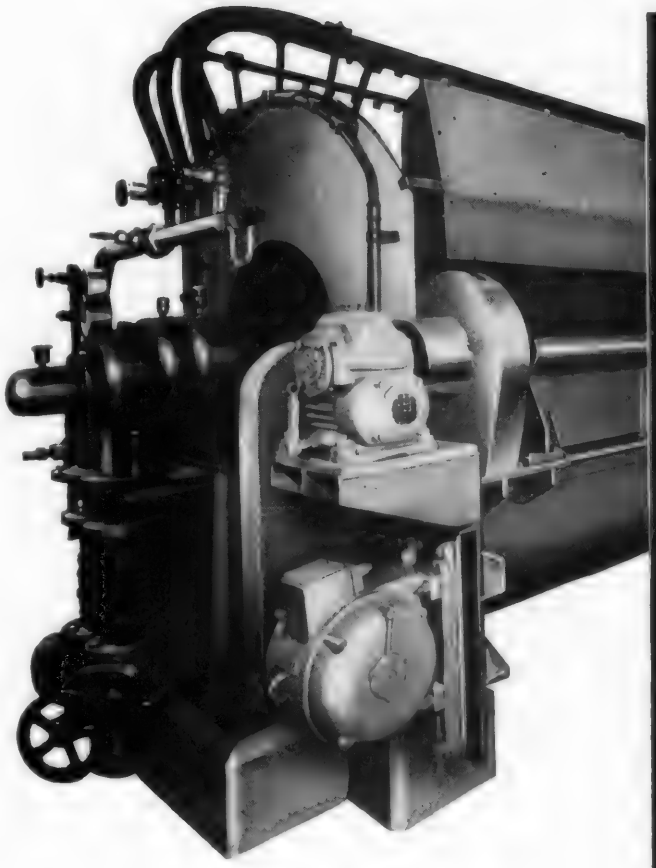
NER 15

FILTERS



One of a pair of 75 sq. ft. Paxman Filters which are installed at the Corn Products Co., Ltd., Trafford Park, Manchester. (Industrial Division of Brown & Polson Ltd.)

FOR THE FOOD INDUSTRY

Many processes in the food industry involve continuous de-watering operations — in addition to which a high degree of purity must be maintained throughout. These requirements are fully complied with by Paxman Rotary Vacuum Filters, fitted with black or white rubber coverings and constructed in stainless steel, aluminium or other suitable alloy metals.

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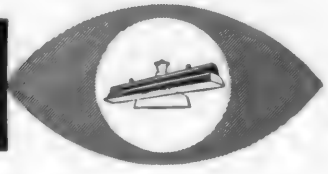

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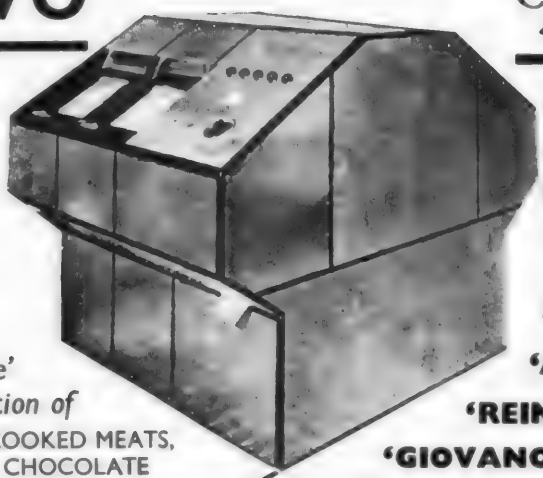

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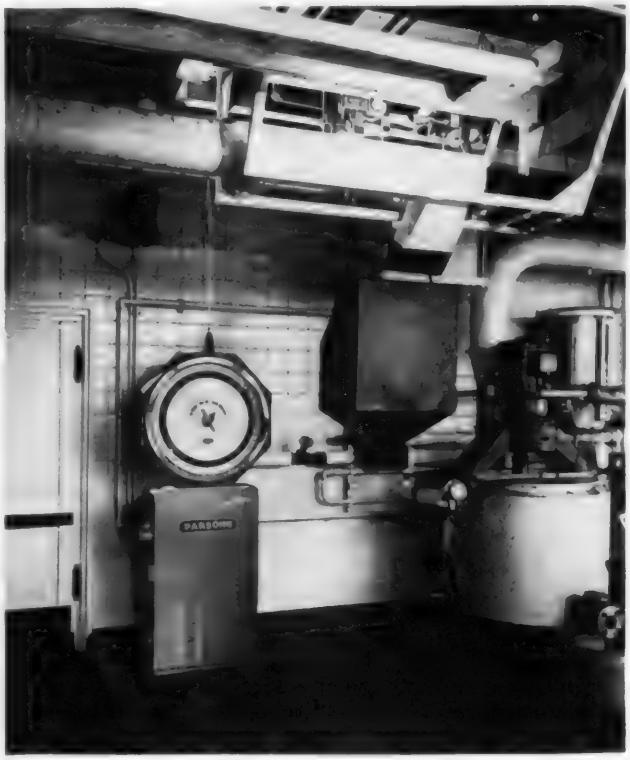

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FOOD MANUFACTURE

Vol. XXXIII, No. 5 May 1, 1958

Protection against pests

THE part played by the scientist in the protection of foodstuffs will be demonstrated by the Pest Infestation Laboratory, D.S.I.R., at the Crop Protection and Pest Control Exhibition, to be held at the Royal Horticultural Society's New Hall, Westminster, from May 12 to 15. The exhibition is being organised and sponsored by *World Crops*, a publication of the Leonard Hill Technical Group.

The D.S.I.R. stand will highlight three main groups of research work currently going on—storage, biology and control—and will include several actual examples of infestation.

The Laboratory's main theme is that prevention is better than cure. For example, a bird's nest will be shown to emphasise how these can very often harbour food pests. A survey has revealed that nests in or on buildings, such as granaries, may contain stored food insects. Pigeons', starlings' and sparrows' nests have been found to house fairly large insect populations, particularly spider beetles, which attack a whole range of foodstuffs.

Good storage of products is an essential requirement and the cardinal points will be given. For example, a waterproof floor, which forms a vapour-proof barrier against rising damp, is not just an ideal. It is essential if products are to be protected from dampness, one of the major causes of trouble. Dry grain will always keep better than damp grain; and very dry grain is less liable to infestation.

Emphasis will also be placed on "good housekeeping." Insects and mites can form permanent populations in spillage in warehouses, factories and ships' holds, where they can infest previously uncontaminated foodstuffs. This threat can be greatly reduced by the proper design of buildings, by orderly stacking and by good hygiene; but chemical control methods have to be used once a product or a building has become thoroughly infested.

Another exhibit will be a grain moisture meter, developed by scientists at P.I.L. and now commercially produced. It has the advantage of simplicity and speed. It can be "spiked" into a sack of grain and gives an immediate reading, so that it is possible to check every sack in a consignment.

Research in the Laboratory includes biological work, to provide information about the rate of development of different insects and their ability to withstand extremes of temperature and humidity; studies of the resistance of the various insects to insecticides and fumigants; and examination of any chemical residues that may be left in treated foodstuffs. More attention is now being given to the source of the problem—often overseas—and P.I.L. scientists have already acquired considerable experience in tropical Colonial countries.

Insecticides in milk

THE large number of chemicals now being used in agriculture continues to give concern to many people. These chemicals include insecticides, fungicides, pesticides, hormones, and other substances of known toxicity or powerful physiological activity, and it is not unreasonable to suppose that there is a real possibility of residues of these substances finding their way into our food, and that consumption of even small amounts of these residues over long periods may have definitely harmful effects.

Our ability to assess this hazard has been limited in many cases by the lack of analytical methods sensitive enough to estimate small quantities of the substances used within reasonable limits of accuracy. At a recent meeting of the American Chemical Society, new and highly sensitive methods were described for the estimation of certain pesticides and insecticides in milk. In one of these, pesticides based on ammonium compounds are determined by the addition of an organic dye, Orange II, to the milk. In the presence of pesticides of this class an orange-yellow colour is formed, the depth of which is proportional to the amount of pesticide present and can be measured by spectrophotometric or colorimetric analysis. Essentially, the milk is first dried to a powder, which is extracted with tetrachlorethane and then suspended in a second quantity of this solvent. The dye is then added, and the mixture is centrifuged before measurement of the colour intensity. The method has been tested within the range 0·5 to 200 p.p.m. of insecticide, and it is expected that by the taking of larger samples a sensitivity down to

0·1 p.p.m. will be achieved. It is also thought that the method will prove adaptable for use with other dried foods.

In the other method described, which is essentially a research tool, experimental insecticides containing radioactive carbon and hydrogen were incorporated in fresh milk, which was then frozen and dried. The resulting milk solids were ground and suspended in a gel, in which their radioactivity could be measured with a liquid scintillating device. By this method, 1 part of foreign material in 100 million parts of milk could be detected, and although the method is obviously inapplicable to routine determinations, it should prove extremely useful in research projects designed to measure the general level of carry-through of insecticides into milk.

Solvent trouble

THE use of solvents for fat extraction from animal and vegetable material is probably the most effective processing method yet available. Originally very volatile and inflammable solvents were used and in various factories they still are, but this is not entirely desirable. Often the type of factory where fat extraction is carried out is not ideally suited for operating a process with special hazards in one particular section. The development of trichloroethylene as a suitable solvent seemed a notable advance. Unhappily, there is increasing evidence that the residue left after fat or oil extraction—material which is usually sold for animal-feed—can have toxic properties. This difficulty was first experienced with soyabean meal, the residue after soyabean oil extraction. The use of this meal was very frequently followed by cases of fatal aplastic anæmia among the unfortunate cattle consuming it. Research has not yet isolated the toxic factor, but the latest studies indicate that it is an organic compound associated with the protein fraction of the soyabean residue (*Journal of Agric. and Food Chem.*, 1958, **6**, 49).

It has, nevertheless, been supposed that this problem of toxic development is associated only with soyabean oil extraction. A new U.S. paper from the University of Minnesota's School of Veterinary Medicine (*ibid.*, 1958, **6**, 227) casts what can only be called a large-sized doubt upon this comforting supposition. Meat wastes, fat-extracted with the same solvent, have been shown to give a residue that also has toxic effects upon young calves, though not upon poultry and pigs. The toxic effects were of the same type, though not as pronounced, as those of trichloroethylene-extracted soyabean meal. As the residue from meat waste fat extraction is so often disposed of as meat-and-bone meal, a much favoured animal feeding stuff, this new finding is one that is bound to cause concern. Paradoxically, trichloroethylene itself is not toxic even to animals that are susceptible to the toxic factor in extracted residues. The theory that the factor is a product of some combination of the solvent with a protein substance now seems highly probable.

Sponsored ice cream

ONE of the most notable features about the present pattern of domestic agriculture is the continued surplus of milk. Efforts have been made to stimulate sales of milk by popularising home-produced cheese and butter, and the Milk Marketing Board has now turned its attention to ice cream. The Board has recently claimed that 99% of the ice cream sold in this country is made without butter fat, and has for some time been reminding the Ministry of Food, with forcible protests, that Britain is the only country in the world in which products of this type can legally be described and sold as ice cream.

Failing action by the Ministry to forbid the sale of ice cream devoid of butterfat, the Board has now decided to sponsor the sale of what it considers to be the genuine article. The first scheme to be sponsored in this way is being operated by Marsdens' Dairies, Ltd., of Sheffield, and is already in operation. The ice cream is being sold under the name *Jester*, and contains 10% butterfat together with 11% solids other than fat and 13% sugar. It is made only from fresh full cream milk with the addition of extra butterfat, milk solids, sugar and stabiliser. The only other constituent is a small quantity of vanilla flavouring. About 3 gal. of milk are used in the preparation of 1 gal. of the ice cream. It is claimed that at retail prices of 3d., 4d. and 6d. the ice cream will cost the public no more than ice cream made from vegetable fats.

Self-service appeal

IT is commonly believed that the growth of self-service marketing owes much of its appeal to the busy shopper with little time to spare. According to motivation research carried out in America, where self-service vending now dominates the grocery scene, this may be a complete misconception. Quoting the results of work carried out there, a recent bulletin of the Self-Service Development Association states that the average shopper is slightly embarrassed when faced by an assistant whom she feels probably knows more about food than she does herself. Shoppers do not like to be hustled into a decision, and they enjoy the freedom of picking up perhaps several items from the shelves and examining them before finally making a choice. As the bulletin says, a great many women are born ditherers, and they revel in the opportunity to "fiddle about."

The presence of an assistant in the conventional

shop is also said to have a very deleterious effect on impulse purchases, which are reported to be as high as 70% for foodstuffs generally and as high as 90% for many glass-packed commodities. In the presence of an assistant, who required the shopper to think what she needed, these impulse sales were found to drop by half.

Even more startling results about the habits of shoppers have been forthcoming, however. Tests made in supermarkets are reported to have shown that shoppers wander round in a bemused state, picking things off the shelves as if in a dream. One research worker was led to this conclusion by counting the eye-blink rate of unsuspecting shoppers. He found that this rate, which is normally about 32 per minute, rising in times of stress to as many as 60 per minute, had fallen in the shoppers observed to a subnormal 14 per minute, indicating a light trance or the first stages of hypnosis. In such a mood, the shoppers were easy prey for the manufacturer who presented his goods in the most attractive fashion.

Acting on this information, some American manufacturers are said to be redesigning their packages to achieve even greater sales impact. They were further stimulated to this by the findings of the experts that for reasons of vanity many women leave off their glasses when going out shopping. As a result, only the most compelling packages are believed to attract these customers.

New fruits for old

EXPERIMENTS which are being carried out in Sweden are said to have indicated that it will soon be possible to buy apples which taste like oranges and pears which taste like apples.

The experiments are still in an early stage, but the scientists responsible for them claim that the results so far obtained are so striking that commercial production should be possible within a few years. Commenting on this new development, a note in the *Financial Times* points out that the orange-flavoured apples may have very considerable significance to the fruit processing trade, since they can be grown easily in temperate climates and might well be used for the production of apple-based preserves with a marmalade flavour.

Quite what the value will be of pears which taste like apples is not clear, although an obvious application is in the replacement of the apples which now taste like oranges. Farmers long since introduced us to the novelty of bacon and eggs which taste like fish, but what the reaction will be, particularly of people in the West Country, to cider which tastes like orangeade it is difficult to forecast. Their cup—if not their glasses—will be full. But maybe perry will come into its own again!

Passing off

IMPORTANT principles with regard to the law of passing off have emerged as the result of the recent decision of the Court of Appeal in *Wilts United Dairies, Ltd.* v. *Thomas Robinson and Co., Ltd.* It would appear from that decision that a person who sells consumable goods may commit the tort of passing off, even though the goods sold are perfectly fit for human consumption. Such a consequence will follow if the circumstances are such that the buyer does not receive goods of the quality and character which he could be reasonably regarded as expecting to receive.

This decision, although it concerned the sale of canned condensed milk, will of course apply to the sale of any kind of goods, whether for consumption or otherwise, for the underlying principle will be the same. The test in every case would be: Is the seller representing the goods to have the qualities which the purchaser would expect them to have, when, in fact, they are lacking in those qualities?

In the case mentioned above, certain quantities of canned condensed milk had been manufactured by the Plaintiffs and supplied by them before March 31, 1954, to the Ministry of Food. Evidence was presented that condensed milk begins to deteriorate approximately 6 months after canning. After that time, although the milk might remain quite wholesome and fit for consumption, certain changes of colour and consistency are likely to occur which might make the milk unattractive to the consumer.

The experience of the trade was that members of the public who purchased tins of condensed milk ordinarily received tins containing milk of recent manufacture which would accordingly be free from the blemishes to which the milk became subject when it became stale.

The Court found that the Defendants, who were buying a quantity of the milk, must have known that the milk had been stocked by the Ministry of Food and had become stale. The Defendants, however, resold the milk without any warning that the milk was not of current production. They were therefore, in the view of the Court, putting on the market stale milk, without any warning that it was not what either the retailer or the consumer would expect to be getting, and further at a price which obtained for milk of current supply.

In doing so, the Defendants were held by the Court of Appeal to be making a representation to the purchasers that the milk, which they must have known was stale, was milk of current production. As Lord Justice Morris put it in his judgment, the issue was whether the Defendants by their conduct made some representation which injured the goodwill of the Plaintiffs.

Many chain stores and supermarkets, as well as

other retailers, make a frequent practice of attracting custom by making bargain offers of canned goods, some of them of considerable antiquity. With this judgment firmly behind them it behoves all manufacturers to ensure that their good name is not being damaged by this type of passing off.

New uses for fats

IT seems but a little while ago that the world-wide shortage of fats was considered critical, and was leading to the adoption of measures such as the ill-fated ground nut scheme. Now there is every sign of a surplus of fats. Butter prices have slumped, with inevitable repercussions in the demand for margarine, and the enormous increase since the war on the use of petroleum-based chemical detergents has seriously affected the demand for tallow and grease for soapmaking. Lard commands a lower price than the producer pays for the fat on the live pig.

Research is therefore being directed towards finding new uses for surplus fats, especially those of animal origin. A booklet issued recently by the American Meat Institute Foundation gives details of some of the lines along which this research is being directed, and of the new uses for fats which have already been developed. It points out that fat splitting, which produces fatty acids, already accounts for about 275 million pounds of fat per year, as compared with almost none in 1940. At least that amount or more is now being used in animal and poultry feeds, as compared with little or none in 1950. The fatty acids obtained by the splitting process have many uses. The largest is in rubber, where they serve as plasticisers and softeners. Specially processed tallow soaps are also used in the manufacture of synthetic rubber, where they prevent sticking of the rubber to the moulds.

Many surface-active agents are made from tallow and grease, or products derived from them, and these are still able to compete in many fields with surface-active compounds derived from petroleum. Thus monoglycerides have many uses in the field of foods and pharamaceuticals, whilst sulphonated monoglycerides and sulphonated alcohols derived from fatty acids by hydrogenation are used in certain synthetic detergents. Di-basic acids formed by the rupture of the molecules of oleic acid and other fatty acids are used as the base for many so-called synthetic lubricants for high-temperature applications in jet engines; they are also used in nylon-type polyamids.

Another interesting use for fatty alcohols and perhaps other fat derivatives is in the formation of a thin film of fatty material on the surface of reservoirs. Such films reduce evaporation and are said to be highly effective in increasing water conservation.

Several possible future uses for fats and their derivatives are also suggested in the report. These include the permanent waterproofing of fabrics, and the stabilisation of soil to increase water retention. Fatty derivatives are also said to show promise as air-entraining agents for concrete, and in increasing the adhesive properties of asphalt and decreasing its brittleness in cold weather.

Applications in the sizing of paper and the flotation of ores are also suggested, and the possibility of combining fatty acids with cellulose derivatives is said to offer great possibilities in the production of synthetics and the creation of fibres, finishing agents, sizes and flooring materials. Preliminary work is also said to have indicated that derivatives of fats can be used in various types of plastics as plasticisers and even as constituents of the basic plastic material. Finally, the suggestion is made that large amounts of fat might be used, albeit after considerable modifications, as additives in petrol and other fuel oils.

It remains to be seen whether any or all of these suggested applications will eventually lead to an increase in the demand for animal fats at an economic price to the producer.

Policy for safety-wise employers

DESPITE the fact that Britain has the strictest factory regulations in the world and a large inspectorate to enforce them, our accident rate does not compare favourably with that of many other countries. In an attempt to encourage manufacturers to institute significant safety precautions in their factories, the British Safety Council has sent copies of an insurance prospectus to all its members, and will do the same for future members. The prospectus describes a special employers' liability policy which has been negotiated by J. Ransome Bentley (Insurance), Ltd., and which gives special rates to the safety-conscious employer. Under the scheme, an employer will receive a bonus in direct relationship to the accident record of his factory, which may range from 25% in the event of no claim to nothing if claims exceed 60% of the premium.

Insured members are also entitled to the free use of an accident prevention service, and experienced surveyors are available to carry out inspection of premises and to make suggestions for removing or reducing the causes of accidents. Policy-holders will also be entitled to free legal representation at police court proceedings for alleged breach of the Factory Act arising out of any injury to an employee which may be the subject of a claim under the policy.

In order to encourage other insurance companies to follow this lead, the British Safety Council has announced that it will offer similar facilities to other firms which can offer benefits likely to reduce the high industrial accident rate.

MECHANICAL HANDLING

A "FOOD MANUFACTURE" SURVEY

Rose's Mechanize New Warehouse

The handling of packed stock in warehouses offers many opportunities for mechanical handling. Here we describe the plans which one firm has adopted for the handling of its bottled goods.

IN pre-war days, the bottling of their Lime Cordial was carried out by L. Rose and Co., Ltd., in premises in Worship Street, London, E.C.2. When war broke out, however, the chairman, Mr. Lauchlan Rose, decided that the existing premises, sited as they were in an area liable to suffer heavy air attacks, were too vulnerable, and he therefore purchased additional premises in St. Albans. His foresight soon proved of great value, for in fact the Worship Street factory was completely gutted in the early days of the blitz, and the company in consequence began operations in St. Albans, which is now the headquarters of an expanding business.

Rose's are now producing a range of fruit drinks, as well as their well-known lime juice cordial and lime and West Indian marmalades; one of their most recent developments is the blending and bottling of Dubonnet apéritif. As their activities have expanded, extensions to the factory have had to be built, and a new warehouse was completed last year. When constructing this warehouse, the firm decided to mechanize this side of its operations, and plans were therefore made to install the necessary equipment for the mechanical handling of the packed goods. The receipt of cardboard cartons also involved a large amount of manual handling, and this operation was mechanized at the same time.

Above: **Rapistan gravity wheel conveyor in use at Rose's factory. In the foreground, a length of portable conveyor is hooked up to the permanent structure. In the middle distance, is shown a spur curve. The powered conveyor in the background is used to traverse a passageway.**

After careful consideration of the merits of various types of equipment, Rose's came to the conclusion that the *Rapistan* range of conveyors, manufactured by Manufacturers Equipment Co., Ltd., best suited their particular requirements, and this equipment was therefore purchased. It was found to be extremely adaptable, and its handy unit construc-

Left: **Bundles of cartons are elevated on receipt to the first floor, from which they are dispatched to the stitching room on an extension of the same conveyor line.**

LAYOUT OF CONVEYORS

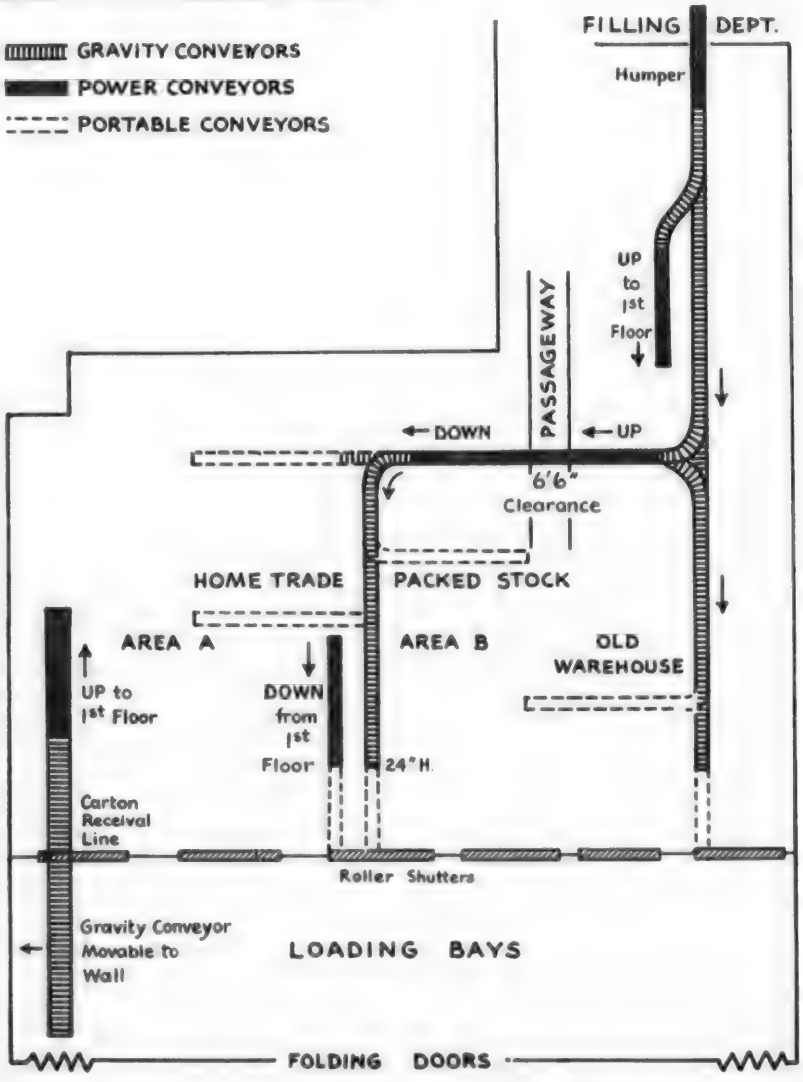
Below: **Ground floor warehouse, showing carton receival, home trade packed stock area, and dispatch arrangements.** *Below right:* **First floor warehouse, where cartons and export packed stock are stored.**

tion meant that erection could be carried out largely by the firm's own maintenance staff—a fact which reduced the overall cost of the scheme very considerably.

Carton handling

Essentially, the scheme adopted falls into two parts—the handling of cardboard cartons, which are received in bundles; and the handling of packed stock. The cartons come to the factory by road, the lorries reversing into a covered bay for off-loading. A gravity conveyor can be placed alongside the open-sided lorries, and the bundles of cartons are unloaded on to this. This conveyor is movable, and can be wheeled to the side of the bay when not in use, as a space-saving measure.

On entering the factory, the carton bundles pass on to a more permanent gravity conveyor, which carries them forward to the foot of the powered elevating conveyor. This lifts them to the first-floor carton store. In many cases, when the factory is busy, cartons are allowed to pass direct from the unloading point to the carton-stitching room, intermediate handling thus being saved. This they do via further sections of gravity conveyor and a horizontal powered conveyor, which delivers them to the top of a metal shoot, down



which they pass to the stitching room on the ground floor. This layout is indicated on the accompanying plan.

When the cartons are not required for immediate use, they are unloaded from the gravity conveyor in the carton store, and moved by small hand trucks to appropriate sections of the store to be stacked until needed. Cartons are delivered from the store to the factory by a simple reversal of this operation.

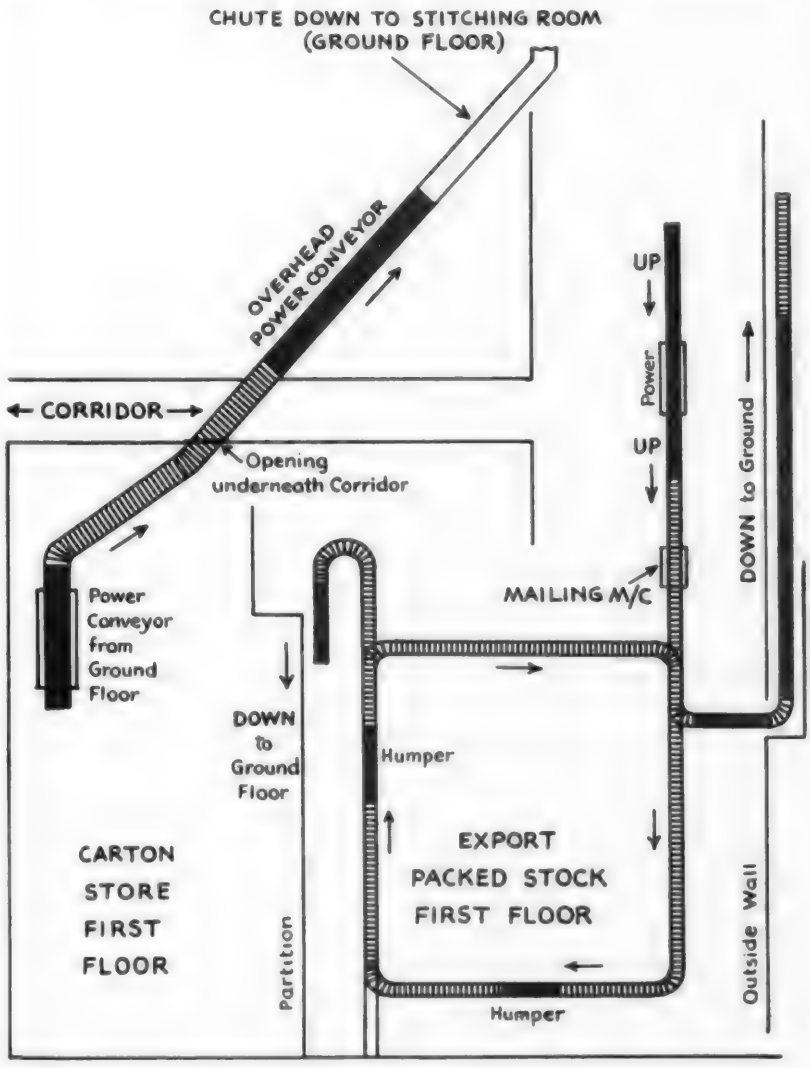
Many sizes of cartons, liners, flats and divisions are used, and the sizes of the bundles vary accordingly. In all, 32 sizes of bundle have to be accommodated, ranging in length from 19 in. to 50 in. and in width from 8 in. to 29 in. It has been found that the *Rapistan* gravity wheel and powered belt conveyors installed are able to handle these bundles of various size and shape without difficulty.

Packed goods

The packed goods warehouse comprises two floors, goods for the home trade being held on the ground floor whilst export packs are stored on the floor above. The largest and heaviest pack handled is that containing one dozen litre bottles of Dubonnet, and the equipment was therefore judged on its ability to handle this pack. A certain amount of roller conveyor was already in use by the firm, and it was found possible to utilise this by tying in sections of it with the new wheel conveyors at appropriate points.

As is shown in the accompanying diagram, the filled cartons leave the filling department by way of a humper, a short powered belt conveyor which lifts them to a sufficient height to allow their conveyance by gravity over the bulk of the distance to be covered. Goods intended for the home market then pass into the storage area marked "old warehouse" on the plan, by means of a straight gravity conveyor, or to "area B" of the new warehouse. In order to carry goods to area B, it was necessary to traverse a passage, and a mechanical belt conveyor, reversible to give maximum versatility of operation, was installed at this point. This carries the goods over the passageway, giving a clearance of 6 ft. 6 in. Another length of wheel conveyor then carries the goods into area B.

The conveyors serving the two routes described above end some 15 ft. from the loading bays. When goods are to be loaded for dispatch by road—the standard method of transport employed—they are carried over the intervening distance by lengths of portable wheel conveyor extendable into the actual lorries. These can also be used to facilitate stacking of goods in the storage areas, which include "area A" on the plan. The lengths of movable conveyor are simply placed at right angles to the permanent conveyors, the goods being diverted on to them by means of flow-diverters. These are lightweight attachments which can be fitted quickly to any part of the wheel conveyor line to divert goods at right angles in either direction.



Export goods

Goods intended for export are diverted from the roller conveyor soon after they leave the filling department and are carried by a powered belt conveyor to the first floor. They are stencilled with the necessary markings on a short length of roller conveyor, and then pass round the system of conveyors shown in the second diagram. Goods are lifted from the roller

Left: **A section of the warehouse for export stock on the first floor. The humper on the left of the picture carries the cartons to the point at which they enter the picture on the right.** *Right:* **The cartons may be distributed to other parts of the warehouse, or sent to the ground floor for dispatch. The use of existing lengths of roller conveyor tied in with the new wheel conveyors is clearly illustrated in both pictures.**

conveyors for stacking, and returned to them for dispatch, at various points along their length. When ready for dispatch, the goods are sent down to the ground floor loading bay by means of the powered conveyor shown in the diagram, or pass by an alternative route to the outside wall of the store, through which they pass to a second loading point at the side of the building. This is also served by a powered conveyor. These two dispatch conveyors are powered of necessity, since the rate of fall is too great to allow gravity delivery to be used with safety.

Junctions in the conveyor lines are catered for by the *Rapistan* spur curve, an ingenious device which allows the flow from two lines to be merged or diverges flow from one line into two. Right angle or 45° models are available, and the flow of goods is diverted down one or other path by the simple operation of a handle, plus the swinging over of a guard rail.

At the moment, only the receipt of cartons and the handling of packed goods has been fully mechanized at the Rose's factory. However, plans are in hand for the installation of fully automatic bottling and carton-filling lines, and the mechanization of the receipt of bottles is also being contemplated. When these schemes have been put into effect, manual handling will undoubtedly have been cut to the minimum compatible with the design of the factory and the nature of the operations carried out.

Handling Food for Retail Sale

Despite the fact that in a self-service grocery the customers serve themselves, a good deal of handling of foodstuffs has to be done by the staff in receiving and storing stock and in replenishing the shelves. The dressing, packaging and weighing of such commodities as fresh meat, poultry and sausages also present handling problems.

Considerable attention was therefore paid to handling problems by John Gardener's when they planned their new Supermarket in Kensington, which was opened recently. In order to facilitate receival of goods by road, a tunnel had to be driven from the service road to the rear of the store, and this was equipped with a conveyor belt, on which the goods are received.

The meat preparation room, showing layout of conveyors and scales.

The conveyor belt is continued in the storeroom by a series of gravity conveyors, on which stock is delivered to various sections for storage, or sent from the storage shelves to the central delivery lift which serves the store above.

In the meat preparation department, illustrated, joints and poultry are dressed in the rear of the room and then placed in metal trays on to a gravity conveyor. Girls stationed at various points along the conveyor remove the items with which they are dealing. The various joints, etc., are then weighed, packaged and priced, the packages being heat-sealed in some cases.

Sausages, ham and bacon, and other sliced meats such as luncheon meat are dealt with in a similar way.

After being weighed and packaged, the meats are stored in cold rooms until required for sale.

Handling problems in the store itself have also been considered, and special trolleys have been designed to negotiate the aisles without inconveniencing shoppers.

The conveyors which have been installed are in this case also *Rapistan*, made by Manufacturers Equipment, Ltd. Refrigeration is by Frigidaire.

How Wall's Handle Meat Products

The handling of over 300 pigs per hour calls for a well-planned production line. We describe below how handling problems are tackled in Wall's new abbatoir, and on their sausage production line.

ON February 21 this year, the Duke of Edinburgh opened the new abattoir at the factory of T. Wall and Sons (Meat Products), Ltd., at Willesden, North-West London. This extension is intended solely for the handling of pigs, and when in full production is capable of processing over 300 carcases per hr. To cope with this high throughput, the line has been mechanised wherever possible, and serves as an excellent example of the mechanical handling techniques which can be adopted in this branch of the food industry.

Carcases fall from the first de-hairer on to a slat conveyor, and are hooked by the hind legs on to gambrels. The suspended carcases are then carried away on the overhead gambrel conveyor.

Slaughtering

Pigs are received at the factory by road, and are unloaded into holding pens occupying two storeys of the building on each side of the unloading bay. After being rested for several hours, the pigs are driven from these pens to one of 2 stunning points. Here they are first stunned electrically then shackled by one hind leg and lifted by an overhead powered conveyor to the sticking pen.

After the necessary bleeding, the conveyor lowers the carcases into a scalding trough, where the shackles are removed and returned by a conveyor to the stunning pen. The carcases are submerged in the trough and pushed along it by a series of parallel horizontal bars, so articulated as to impart a downward and forward motion to the carcases during their passage through the tank.

At the far end of the scalding tank the carcases are picked up by a toothed steel conveyor, and lifted to a de-hairing machine. Through this they pass by gravity, most of the accessible hair being removed in the process by the rapidly revolving scrapers contained in the de-hairer. On emergence from the de-hairer the carcases fall on to a slat conveyor, where gambrels are inserted into the hind feet. These gambrels are hooked on to overhead rails, along which they are moved by endless chains fitted with suitable projections, which circulate just above the rails. The carcases remain suspended in this way until they enter the curing cellars or boning department.

The carcases next pass through a singer, designed by Wall's and believed by them to be unique in the fact that the carcases are effectively treated without ceasing to move along the production line. A second de-hairer and "black-scraper" follows, and when the pigs pass to the dressing line a very small amount of hand scraping of the most inaccessible places is sufficient to complete the de-hairing process.

Dressing

As the pigs pass along the dressing line, they are first cut down the backbone and the belly in the usual way. The gut is then removed and placed in a stainless steel tray carried on a continuous conveyor, whilst the pluck is suspended from a hook carried by an overhead conveyor. These trays and hooks are synchronised so that the gut and pluck are carried along with the carcase from which they were removed to the veterinary inspection point. Here a check is made against possible disease, any condemned carcases being removed immediately along with the corresponding parts to the inedible products plant.

Healthy carcases are then weighed before the flare is removed. The flare is hung from hooks carried on suspended racks,

Two views of the gut processing room. *Left:* **The gut enters the room on a conveyor belt, the fat end being removed and placed in the elevated chute in the foreground. The stomach is also removed and passes to the sink at the end of the conveyor.** *Right:* **The intestines are placed on a second conveyor running at right angles. Here the runners are removed and carried by a small conveyor to the cleaning machines, seen on the left of the picture. The mudgeon fat is placed in an overhead chute over the conveyor belt. The black gut falls from the end of the conveyor to the floor below.**

on which it is conveyed from the dressing line to a small room in which the kidneys are removed. The rail carrying the racks then passes over 2 steam-rendering lard kettles, into either of which the contents of the racks can be dropped simply by pulling a small handle at the side of each rack. The empty racks are then returned on the continuous rail to the dressing line.

The carcases are next split and the backbone is removed. They are then passed to chilling rooms serving the boning room and the curing cellar on the floor below.

Gut processing

Meanwhile, the gut and pluck are being dealt with. The pluck is unhooked as it is carried by the conveyor from which it is suspended past a stationary arm, and falls down a chute to a lower floor. The gut is removed from the stainless steel trays in which it was placed and carried by a belt conveyor into a room adjoining the dressing line. This room forms in itself a microcosm of planned handling, and is well worthy of consideration. As the gut enters the room, the fat end is first removed and placed in an overhead chute, down which it drops into running water. It is then washed and trimmed and turned inside out, ready for use as casings for liver sausage. The stomach is also removed, and passes to the end of the conveyor belt, where it is opened and washed prior to being cooked and minced in another department.

The intestines are placed on a second conveyor belt running at right angles down the rear of the room. The small intestine is first run off, and passes down a short chute to another conveyor belt, which carries it to a battery of *New Era* cleaning and finishing machines. Here it passes through a series of rubber and metal rollers, which effectively empty it and remove the outer skin (threads) and mucous lining. Water is then passed through and the gut is examined for holes, being broken off wherever a hole occurs. Finally, pieces are selected for width and measured in bundles of 100 yd., before being salted down for use as sausage casings.

The mudgeon fat is next removed and placed in a second overhead chute, down which it is washed by jets of water. It is collected at the end of the chute in cold running water, and is removed after washing and added to the lard kettles.

The black gut falls from the end of the rear conveyor to the room below, where it is hashed before being pumped to the inedible products plant.

Boning and curing

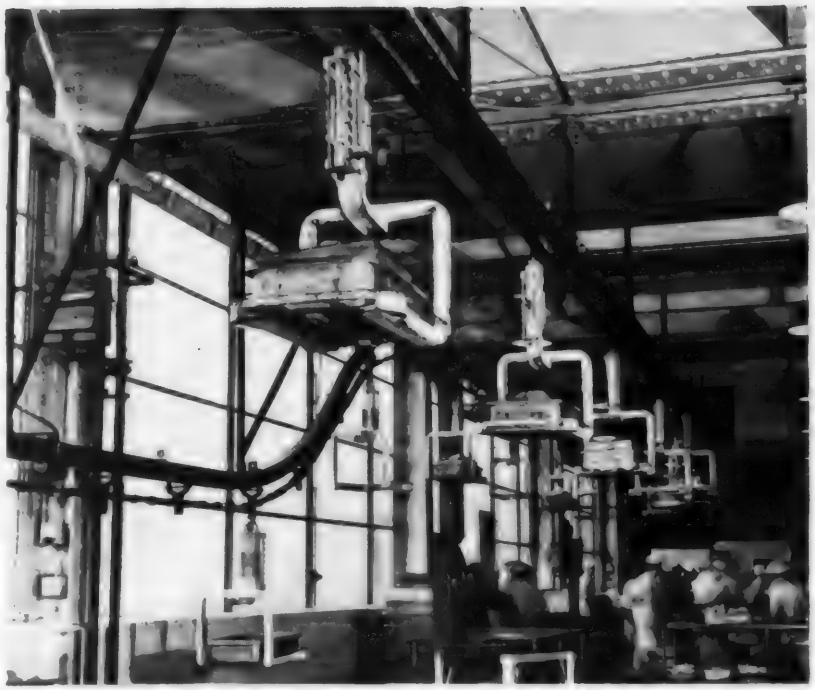
In the boning room, the cooled carcases are divided into shoulders, middles and legs, which are placed on a conveyor belt for distribution to the transversely placed boning tables. Shoulders are boned out for sausage meat, of which they provide the bulk. Legs may be distributed as such to the retail trade, or may be cut into gammon pieces for curing. Certain selected shoulder cuts are also cured as cut pieces.

The bulk of the meat for curing is provided, however, by the backs and bellies. Bellies are left with the rind on for the production of streaky bacon. The back cuts have the rind removed, and the fat is trimmed where necessary to a suitable thickness. Backs and streaky portions are then collected from the boning tables and fed by chute to the curing cellar. Here they fall on to a conveyor belt, which feeds to an automatic brine injector. They are fed by hand into this machine 2 at a time, and a manifold of needles injects the brine at intervals along the pieces as they pass on a mesh belt through the machine. Surplus brine falls to the supply tank below and is recirculated. The pumped pieces pass to a further conveyor, which carries them to the brine tanks, in which they are stacked by hand. Gammon and shoulder

pieces are handled in the same way.

After curing, maturing and smoking, the pieces are transported to the factory of T. Wall and Sons (Handy Foods), Ltd., at Isleworth, where they are deep frozen, sliced, and vacuum packed, ready for distribution to the retail trade. Some shoulder and gammon pieces are also vacuum packed without slicing as cooking joints.

A number of graded sides are also cured whole by the traditional Wiltshire tank cure for sale in the normal way.



On the sausage raw materials' conveyor trays of weighed ingredients are carried from the scales to the sausage preparation department on an upper floor.

Sausages

Various branches of sausage production occupy parts of four floors. On the lowest of these, spices are ground and mixed, the mixed spices then being weighed by hand and placed in bags, each holding the correct amount of spice for one chopping. Rusk is also stored on this floor. When required for use, it is fed from sacks into the hopper of a small enclosed bucket elevator, which carries the rusk to the floor above. Here it is delivered in bulk down a chute attached to a weighing machine, where aluminium trays are filled with the requisite amount for one chopping.

Other meats such as beef and mutton are also prepared and weighed on this floor. The trays carrying the ingredients are then placed on cradles suspended from an overhead monorail conveyor. This carries them to the floor above, where the lean and fat pork required by the recipes are added. The trays are then elevated yet another floor, to the sausage preparation department.

The monorail conveyor serves the chopping machines, which are assembled in a double row down the middle of the room. The cradle carrying each tray is marked with the code number of the type of sausage for which it is intended, and according to the recipe for which the ingredients have been selected and weighed. The cradle also carries a protruding peg, which may be raised or lowered to occupy one of several positions. Each chopping position has opposite it a trip device which may or may not engage with this peg, according to the position in which the latter is set. Thus when ingredients selected and weighed out according to the recipe for a particular type of sausage reach the chopping station at which that type of sausage is actually being prepared, the trip system is put into operation. This actuates a hydraulic mechanism, which lifts the tray of ingredients clear of the carrying cradle, allowing the latter to pass on round the system. The tray is then lowered on to a short length of roller conveyor next to the chopping bowl, ready for use.

As trays containing ingredients made up according to different recipes pass this station, the two parts of the trip mechanism fail to coincide, and the conveyor passes on without discharging its contents.

As the cradles are emptied they pass around the continuous system and finally back to the lower floors to repeat the cycle.

After chopping, the sausages are filled in the usual way, and after a preliminary weighing the links are suspended on hooks which travel on a continuous belt through the cooling chamber provided at each filling station. Here the sausages are chilled rapidly to about 40°F. in a draught of refrigerated air, which serves also to dry the outside of the sausages. On emerging at the opposite side of the chiller, the sausages are given a final weighing, bundled, and wrapped. The wrapped sausages are placed in trays, which are loaded on to a belt conveyor running round the outside of the room. This carries them to the central products lift, which carries all finished goods to a cold store on the ground floor, where they are held prior to dispatch. The trays of goods are lifted automatically from the lift as it passes this store, and run along one of 2 roller conveyors which traverse the rear of the store. From this they are stacked on stillages and held until they leave the factory.

Despatch

The stillages are carried by hand-drawn lift trucks into the despatch department, which lies alongside the cold store. Goods which are to be despatched by rail

are packed in cartons, and loaded on portable roller conveyors into the B. R. vans outside. The bulk of the despatch is done at night, however, when the company's vans are loaded with the trays of the various products. Again, portable roller conveyors are employed for handling purposes. Returned trays are carried by conveyor to the basement of the building.

SOME SUPPLIERS OF EQUIPMENT

De-hairers: *Cincinnati Butchers Supply Company, Cincinnati, Ohio; Th. Gjerstrup, Ltd., Copenhagen.*

Slat conveyor: *Abattoir Appliances, Ltd.*

Gut cleaning machines: *E. A. Bitterling, Limited.*

Brine injection machine: *Allbright-Nell Co., Chicago.*

Sausage raw materials conveyor: *Geo. W. King.*

Bowl choppers and fillers: *J. C. Wetter and Co., Ltd.*

Sausage coolers: *J. and E. Hall, Limited.*

Skinless sausage linkers: *Linker Machines Inc., Newark, U.S.A.*

Part of the sausage department, showing sausages emerging from the cooler, ready for final weighing and wrapping.

Blending and Packing Tea

THE cleaning, blending and packing of tea for the home and overseas markets normally demands extensive premises with second, third or fourth floors, since each stage in the bulk-to-packet procedure primarily depends on the loose tea being gravity-fed to various points.

At the new Bletchley premises of Joseph Tetley and Co., Ltd., however, every operation, from the reception of the tea in bulk to the final packing for the retailers' shelves, is carried out on one single floor—an innovation of considerable interest to the tea-packing industry in general.

There are some positive advantages in single-floor cleaning, blending and packing of tea. A one-floor factory means that rates and insurances on the building itself are not so heavy, and with a single-floor system the maintenance of feed lines, conveyors, elevators, hoppers, blenders and other requisite equipment is consequently a simpler and easier matter.

That the Bletchley enterprise has proved successful from all points of view is demonstrated by the fact that further ramifications of the single-floor system are already in hand.

When Tetleys decided to build completely new premises at Denbigh Road, Bletchley, as an addition to their existing plant at Osborne Street, Bletchley, and Worship Street, London, they planned a modern single-floor building covering about 50,000 sq. ft. The problem, of course, was to have all the traditional advantages of a 3- or 4-storey building on the one single floor. It became obvious that the solution to the problem was an automatic conveyor and elevator system specifically adapted for the purpose of blending and packing large quantities of tea quickly and efficiently.

Henry Pooley, Ltd., the consulting engineers to whom Tetley executives took their problem, recommended Redler Conveyors, Ltd., who have specialised in the design and construction of *en masse* material handling plants for many years, and throughout the whole project Redler engineers worked in collaboration with the tea company's own engineers.

A most important feature of the Redler *en masse* system is that during all elevating and conveying, the loose tea is not bruised or damaged in any way. It "flows" in totally dust-tight casings—conveyed smoothly and efficiently by skeleton-type chain links in such a manner that there is no pressure on the tea leaves, no movement between them and no breakage or bruising of the leaves during transit.

A comprehensive elevator-conveyor system was completed, and a short time after the new factory was built Redler conveyors were moving many thousands of pounds of tea per hr. through the hoppers and blenders and finally into the packing machines themselves.

Initially, cases of tea—straight from the docks—are brought to the first-stage cleaning. At this point electrically motivated vibratory screens sift the dust and any other foreign matter from the leaves.

The cleaned tea is then moved through two separate, totally enclosed conveyor shafts, powered

(*Concluded on page* 198)

HANDLING TECHNIQUES AT PEEK FREAN'S

When countless small units have to be transported from one section of a factory to another, handling problems are multiplied and a versatile system is called for. The handling techniques adopted at the Peek Frean biscuit factory are described below.

THE production of biscuits on such a scale as is represented by the operations of Peek, Frean and Co., Ltd., is essentially a mechanical operation. At the Bermondsey factory of this firm, many of the steps necessary in the production of high-class biscuits of uniform quality are performed by fully-automatic machinery of the most modern type. Apart from the handling and conveying which forms an integral part of the operation of these machines, however, a great deal of handling of raw materials, products, and packaging material is involved in the day-to-day working of the factory, and mechanical handling techniques have been evolved to reduce labour wherever possible.

A battery of Forster wrapping machines delivering wrapped biscuits on to a belt conveyor for packing by hand into tins.

Choice of handling methods

Peek Freans celebrated their centenary last year, and the site of the present factory was purchased as long ago as 1876. When some of the existing buildings were erected, ideas of mechanical handling, where they existed at all, were only rudimentary, and it has not always proved easy for the firm to adopt the premises to modern materials handling techniques. Moreover, a tempering process, involving a time lag, is necessary after many of the operations—dough must be proved, cream fillings must set, icing must harden, and so on. Finally, raw materials for many of the machines — cream-filling machines, wrapping machines, etc.—must be drawn from several points within the factory, and the products may have to be distributed to several points. Under these circumstances, any handling system adopted must have as its cardinal feature versatility, and Peek Freans have found that the wide use of platforms or stillages, or in some cases pallets, handled by hand-drawn or powered lift trucks, according to the size of the load, best suits their particular requirements. Conveyor systems have been installed, however, wherever their use offered greater advantages.

Raw materials

Sugar and flour are received at the factory in bags, and are handled in this form until they are used in production. The flour is delivered by road, the sacks being elevated to the flour store by means of a special elevator designed to lift the sacks singly in rapid sequence.

The flour is blended before use, being re-bagged after the blending operation and stored again until required. All handling of the bags is carried out by means of small hand trucks.

The sugar is unloaded in a similar way, but the sugar bags are loaded on to pallets in the store and handled by forklift truck.

Containers of other raw materials such as cooking fat, dried fruit, chocolate, etc., are also handled either as units or on platforms or pallets, as best suits the lay-out of the stores and the size of the units being handled.

Production departments

In the dough-mixing department, the ingredients are mixed in rotary mixers of the firm's own design. These discharge the dough into delivery chutes to the floor below, where it is caught in wheeled troughs. Soft doughs are wheeled in these troughs straight to the autoplants—a series of completely automatic biscuit-making machines. Hard doughs have first to be rolled out in dough breaks and then tempered for a suitable period in specially heated proving rooms.

Once the dough is fed to the autoplants, the rest of the operations, up to the removal of the baked biscuits from the line, is

Above: **" Cheeselets " are fed to an automatic filling machine by a Valco vibrating spiral feed.**

Left: **Measured quantities of the biscuits are then filled into bags which are removed by a conveyor for sealing.**

completely automatic. The plants comprise sheeting rollers, sugar sprinklers, washovers and other accessory attachments, as well as cutting and embossing units and a scrap return system. The cut biscuits pass straight into the ovens, which are of the steel band or wire web type according to requirements. Some idea of the size of these units is given by the fact that the latest autoplants installed at the Peek Frean factory are no less than 172 ft. long. (Another automatic biscuit plant made by T. and T. Vicars, Ltd., installed in Peek Frean's factory, is described and illustrated on pp. 100-1 of the March issue of FOOD MANUFACTURE).

On emerging from the ovens, the biscuits are partially cooled by a blast of cold air in some cases, after which they are overlapped on to cradle conveyors. These lift the biscuits and carry them overhead to the packing points, allowing them to cool naturally in transit.

The biscuits are removed by hand from the stacking machines and packed into shallow trays, which are in turn stacked on platforms. These are then transported by platform trucks to the various packing departments, or to the sections of the factory where further processing takes place.

Further processing

This treatment of the biscuits may take such forms as partial or complete chocolate enrobing, icing, cream filling, etc. The biscuits are delivered in the trays to the machines performing the various operations, and are then, in general, re-packed into trays for transportation to the packing departments. The actual processes are entirely automatic, and in most cases are carried out at very high speed, but the multiplicity of the various operations precludes their being linked by any continuous mechanical handling system, and the method adopted of carrying the biscuits in trays stacked on platforms has proved to have the necessary versatility for this type of operation.

Packaging

In an article of this type, it would not be possible to give details of the packaging of all the many types and size of pack which Peek Freans produce. A few examples must therefore serve to describe the techniques employed. One such is provided by the packing of mixed biscuits in tins.

In this operation, the packing line is designed to occupy 3 sides of a square, along the fourth side of which run the conveyors for the empty and filled tins. The empty tins are removed from this line and placed on short lengths of roller conveyor, which serve as filling tables. Trays of the various types of biscuit used in the pack are placed behind these, supported at a convenient angle for the girls to draw biscuits from them for filling into the tins. Each girl fills 3 or 4 types of biscuit, interpacking them with corrugated paper where necessary, and then pushes the tin along the conveyor to the next girl. The tins come round twice to each filler, as the biscuits are packed 2 layers deep. The filled tins are then closed and put back on to the appropriate section of the conveyor, which carries them to the labelling room above.

The conveyor for the empty tins runs continuously around this packing room, being fed by a conveyor from the floor above, where the empty tins enter the system. This feed conveyor is actuated by a Radiovisor electric eye, which sets it in motion when gaps occur in the supply of tins on the circulating line. Besides each packing

station the conveyor passes beneath a stationary metal plate, over which the tins are pushed. Should the supply of empty tins circulating round the system become sparse, 3 tins are left on this plate ready for the use of the packers, until they are pushed along by fresh tins added to the line. This conveyor system was manufactured by Sovex, Ltd.

Another example of packaging is provided by the filling of "Cheeselets," this operation being carried out with the aid of *Valco* machinery. The small square biscuits are tipped into the hopper of a spiral elevator, which feeds them into an automatic bag filling machine. The elevator is unusual in that it does not revolve but simply vibrates. This vibratory motion is sufficient to carry the biscuits upwards around the spiral, at the top of which they are fed off into the automatic filler. The filling hopper is fed by two streams of biscuits, one giving the bulk of the amount desired and the other feeding a trickle of biscuits to make up the final quantity.

The biscuits are tipped into greaseproof bags, which are then packed inside a carton overwrap. Smaller packs, heat-sealed in film bags, are produced on a similar machine.

Another pack now achieving great popularity is the No. 3 Assorted. In this, 8 types of biscuit are wrapped in lots of 3 to 8, according to size, 12 packets of each kind then being packed into a tin. The various kinds of biscuits are fed by hand into a battery of Forster wrapping machines, in which they are wrapped in printed cellulose film. Each machine discharges the finished packets at a different distance across a transverse conveyor belt, which carries them to the operatives filling the tins.

One group of 4 wrapping machines engaged on this operation is shown in the accompanying illustration.

Returned tins

The handling of returned tins presents something of a problem in itself. As the tins are received, they are first emptied of loose packing material, which is placed in a chute for delivery to the incinerators. The tins are then placed on conveyor belts, which elevate them to 2 spiral roller conveyors, each serving a Kellie tin-washing machine. These clean the tins, first by a detergent wash and then by a clean-water rinse. The washed tins then pass through a drier before being delivered to a further system of conveyor belts, which carries them to the floor above for storage, prior to their re-use.

Conveyor equipment in this section of the factory was designed and installed by Paterson Hughes Engineering Co., Ltd.

The cost and handling problems inherent in the use of returnable tins has induced the firm to go over increasingly to the use of fibreboard outers, and these are now in general use for some of the products. These cases are said to give good protection to the biscuits, and to be popular with retailers. They are sealed automatically by Adams Powell equipment.

Small electric lift trucks are used in the factory for transporting biscuits. The one illustrated is a BEF truck made by Wingrove and Rogers.

SOME SUPPLIERS OF EQUIPMENT

Conveyor systems: *Sovex, Ltd.; Paterson Hughes Engineering Co., Ltd.; Manufacturers Equipment, Ltd.*
Lift trucks: *Ransomes Sims and Jefferies, Ltd.; Lansing Bagnall, Ltd.; Wingrove and Rogers, Ltd.; Vickerys, Ltd.*
Wheeled tin racks: *Willmot Trucks, Ltd.*
Biscuit elevator and cooler: *Thrissel Engineering Co., Ltd.*
Ovens *T. and T. Vicars, Ltd.; Baker Perkins, Ltd.*
Wrapping machines: *Forsters Machine Co., Ltd.; Naish Bros. and Co., Ltd.*
Spiral elevator and automatic filling machine: *Valley Products (Lye), Ltd.*
Electric eye: *Radiovisor Parent, Ltd.*
Case sealer: *Adams Powell Equipment, Ltd.*
Tin washer: *R. Kellie and Son, Ltd.*

Determinative Bacteriology

Bergey's Manual of Determinative Bacteriology is such a world-wide standard work of reference that it now needs no description. In the recently published 7th editions however, several important changes have been made. Chief amongst these is the elimination from the manual itself of much information regarding species which have not been adequately described or could not be definitely placed. This information, together with many of the less important synonyms for accepted species and the index to all the literature of both accepted and poorly described organisms, has been transferred to a volume to be known as the *Index Bergeyana*. The host and habitat index will also be found in this newly titled volume. The result is that the Manual itself contains descriptions of many more species, and more adequate descriptions of those previously listed, and yet is reduced to a more convenient size.

Another alteration contributing to this reduced size has been the omission of much material of historical interest, which it was felt was adequately covered in the 6th edition, and need not be repeated. The naming and classification of viruses which appeared in the 6th edition have also been omitted, as many authorities criticised its inclusion as being premature.

Bergey's Manual of Determinative Bacteriology. By R. S. Breed, E. G. D. Murray, and N. R. Smith. 7th Ed. 1957. Baillière, Tindall and Cox, London. Pp. xviii+1094. 120s. net.

MECHANICAL HANDLING EQUIPMENT

LIFT TRUCKS

THE increasing trend to lay down governing standards and tests has done much to promote higher degrees of safety, reliability and efficiency in present-day industrial products. As a result of many years of detailed research, a series of four tests for the stability of forklift trucks has recently been published. Designed to ensure an adequate safety margin under normal conditions, these tests fully recognise the need for all-round stability, by tilting the vehicle quite steeply on both fore-and-aft and lateral planes. In fact, the severest working conditions are actually reproduced.

With the value of these tests in mind, Ransomes Sims and Jefferies are producing a new range of forklifts, based on their *FL* series. The latest of these are the *NR* 20, a development of the *FL* 2000, and the *NR* 30 models.

A battery-powered forklift truck, the *NR* 20 will transport and stack loads of up to 2,000 lb. at a load centre of 24 in., and up to 20 cwt.

Above: **The Ransomes NR 20 can handle loads of up to 2,000 lb.**

(2,240 lb.) at 20 in. The standard freelift is 4 in. and the lift can vary as required from 96 in. to 168 in. Particular attention has been paid to operator convenience, and all controls are simple and near at hand. Both foot and hand brakes are provided, incorporating internal expanding brake shoes. Steering is through a totally enclosed Marles oil-bath steering box operating on the rear wheels.

Attachments available include operator's overhead guard, load backrest, load clamp, rotary forks, fork extensions, crane attachment, Bickerstaff brick forks and pipe lifters. Also available are a ram for loads with a centre opening, a swarf handling hopper, bin attachment, load stabiliser, rotating paper roll clamp, and a side shift to facilitate close manœuvring. A new feature of real practical value is the inclusion of a check valve to prevent the too rapid descent of heavy breakable loads (whilst still allowing the forks to fall rapidly when unladen).

The *NR* 30 model has a load capacity of 3,000 lb. (1,500 kg.) at a load centre of 24 in. (50 cm.). Standard heights of lift are 96, 120, 144 in., although any height from 60 to 168 in. can be supplied. With the truck can be provided all the usual accessories, such as the load clamp, side shift, full free lift, paper roll clamp, etc.

The *NR* 30 follows along the same lines as the *NR* 20 in design and operational characteristics. Driver comfort and convenience have been carefully observed, as well as easy accessibility for maintenance and lubrication. A number of special features have been incorporated, such as two self-aligning tilt cylinders to relieve the mast connecting rods of all road shock strain. There is a rapid means of detaching the mast unit from the chassis, a special arrangement of control gear to permit easy accessibility to the inner parts of the truck, and "one-shot" lubrication of most parts. With loads in excess of about 200 lb. the lowering speed is automatically reduced.

Lansing Bagnall also make a range of electric forklift trucks. Their *FOER* 323 model has a capacity of 2,300 lb. on pallets 40 in. sq., and lifts loads to 10 ft. in 20 sec. The *FOER* 330 is a similar model of 3,000 lb., which

The Lansing-Bagnall type *SFR* fork-lift truck which, in this instance is being used with a specially designed carton clamp which does not require pallets.

will elevate the load to 20 ft. in 26 sec. Both models will stack at right angles in aisles 9 ft. wide. Other features include a multi-step speed controller, which allows an infinitely variable speed up to 5 m.p.h., and a 16 in. steering wheel fitted with a knob to permit easy one-hand steering. The mast comprises a twin telescopic assembly running on widely spaced rollers, any side thrust caused by off-centre loading being taken by additional rollers in the mast and fork carriage assembly.

Lift and tilt mechanisms are hydraulically operated, hydraulic power being provided by a $3\frac{1}{2}$ b.h.p. electric motor. A safety device is incorporated to prevent loads dropping in the event of hydraulic pipe failure. Batteries are re-charged simply by plugging into the nearest 200/250 v. supply.

The *PF* model, made by the same firm, is a pedestrian operated lift truck, also of the tilting mast type. All lift and tilt movements can be smoothly controlled by means of two levers, and lifting speed is said to be exceptionally high. Speed is infinitely variable up to 4 m.p.h., and is controlled by a twist-grip on the steering handle.

The Conveyancer New Reach fork truck can lift 2,000 lb. at 24 in. load centre.

REACH TRUCKS

Another interesting model made by Lansing Bagnall is the *SFR* 225 stand-on reach fork truck. This has a lifting capacity of 2,500 lb., and is designed to work in aisles only 5 ft. 6 in. wide. During normal forward movement the load is carried within the wheelbase of the truck, a feature which gives the trucks enhanced stability. In an accompanying illustration, this truck is shown in use with a specially designed carton clamp, which eliminates the need for pallets.

A reach truck carrying the load within its own wheelbase is also made by Conveyancer Fork Trucks, Ltd. This is also a stand-on model developed for use in narrow aisles. It has a maximum capacity of 2,000 lb. at 24 in. load centre. A 3,000 lb. version is planned for the near future. Other lift trucks made by this firm include the *Conveyancer TC*-6 (Series IV), a diesel/petrol fork truck with a capacity of 6,000 lb. at 20 in. load centre. A yard model with a capacity of 2 tons is also available. Both models incorporate a torque convertor drive. Electric lift trucks are also produced, examples being *E*2-20 and the *E*2-24, which are highly manœuvrable 3-wheeled models, and the *E*6-24, which is a 6,000 lb. capacity model.

Many of the Conveyancer series of trucks can be fitted with attachments for handling different types of load. These include forks for handling unit loads of crates without pallets, and a *Skid-Stac* attachment, which enables economies to be made by replacing pallets with thin sheets of fibre board. Drum handling forks, capable of handling 1, 2 or 4 drums, with or without pallets, are also available.

Lift trucks and hand stackers are also featured in the range of products made by Eccles (Birmingham), Ltd. Their *Code* 675 hydraulically operated 1-ton lift truck is mounted on twin ball bearing wheels with oil seals and a permanent grease packing. The wheels are available either in cast iron or heavy duty rubber tyred. The provision of lubrication for life is of great benefit to the food trade where cleanliness is vital, and also every effort has been made to shield the hydraulic mechanism from the lifting portion of the truck, again with the object of cleanliness in view.

The Eccles 15 cwt. *Hand Stacker* has its working parts fully enclosed and is particularly suitable for the loading of lorries and similar applications. In order to gain maximum benefit from this piece of equipment it is fitted with heavy duty wheels similar to those fitted to the 675 Lifting Truck. Again these are grease packed for life.

Eccles also manufacture stillages and trucks to customers' requirements, and have had considerable experience in supplying equipment of this nature to various firms in the food trade.

STACKERS

A range of interesting pedestrian-operated lift trucks and stackers is made by Salisbury Precision Engineering, Ltd. Their *Sherpa* Model I is a push truck equipped with a hand-powered hydraulic lifting platform capable

of raising loads up to 2½ cwt. to a height of 3 ft. 1½ in. Model II is a larger unit, which will lift loads of 5 cwt. to a height of 4 ft. 11 in. Pallet forks and drum or barrel clamps are available for both models. The lifting mechanism is fitted with safeguards against overloading, and Model II has a dual-speed pump which enables small loads to be lifted more rapidly. *Sherpa* Models IIIa and IIIb extend the range, being capable of lifting loads of 7 cwt. to heights of 3 ft. 10 in. and 5 ft. respectively. Both can be equipped with dual-speed hand pumps or adapted for mains electric operation. Model IIIb can also be fitted with a battery-operated pump. Other models available include Model IVA, a battery or mains powered model which will lift loads of 7 cwt. to 7 ft., and is equipped with simple push-button control. It can be turned in its own length, and is therefore valuable for use in confined spaces. Models VIIa and VIIb are telescopic stackers, battery or mains operated, which will respectively lift to 10 ft. loads of 10 cwt. and 15 cwt.

STAIR CLIMBERS

Salisbury Precision Engineering, Ltd., have also developed a *Sherpa* stair-climbing truck. This enables loads up to 1½ cwt. to be successfully transported up or down a flight of stairs by one man. The truck is of tubular construction and the handle is cranked for convenient control. Instead of the usual wheels the truck is fitted with two "spiders," each fitted with four smaller rubber-tyred rollers. These effectively mount each separate tread and riser so that the load moves in a straight line without jolting.

A Ransomes NR 30 forklift fitted with side shift and load clamp.

A control lever on the control handle enables the operator to engage a ratchet mechanism so that when going upstairs the "spiders" will only revolve in one direction, allowing the operator to pause without the danger of the truck running backwards. For going downstairs the ratchet is disengaged and a permanent brake engaged which again prevents the load running away, slight force being necessary to push the load downstairs.

On level ground the equipment can be used as a conventional sack truck. Loads greater than 1½ cwt. can be carried, but two men are then necessary when going upstairs.

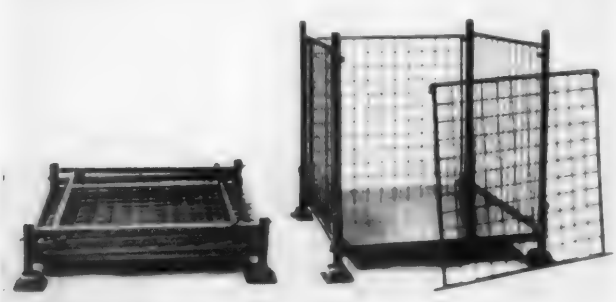
A lightweight versatile hand truck which can be moved up and down stairs is also being marketed in this country by Industrial Trucks, Ltd., under the name of the *Stepmaster*. The truck is constructed of sections of aluminium alloy, but despite its lightness it is said to be very strong and capable of carrying weights up to 1 cwt. Movement of the truck up and down stairs is made possible by the use of retractable tracks and 8 in. cushion-tyred wheels with roller bearings. Because the tracks are retractable, the truck can be used with ease on level surfaces, the tracks being lowered for the negotiation of steps by the simple movement of a catch.

PALLETISER

The *Palletiser*, manufactured by Paterson Hughes Engineering Co., Ltd., is reported to have aroused considerable interest among manufacturers, particularly those running bottling plants. This piece of equipment enables one man, receiving goods from a conveyor, to assemble them in tiers in a pre-arranged pattern on a pallet, which is then discharged from the delivery side of the unit ready to be picked up by a lift truck. Comparatively little effort is required of the one man operating the machine, and a rapid throughput can be achieved. A pallet magazine is incorporated, from which the pallets are delivered automatically as required. Pallet sizes may vary from 36 in. sq. to 48 in. sq. in any combination, and package height may be up to 24 in. Each tier on the pallet can be assembled in approximately 20 sec.

PALLETS

A new collapsible box pallet is shortly to be marketed by Barron and Shepherd, Ltd. The pallet is described as being strong but also exceptionally light, so that it can easily be handled by female labour. It can be erected or folded in a few seconds. Two of the sides are automatically held in an upright position, whilst the other two are removed for filling or emptying the pallet. When the pallet is folded it takes up a minimum of space, since the sides fold flat and the



A collapsible box pallet made by Barron and Shepherd, Ltd.

Sherpa Model II Handraulic lifting truck fitted with dual speed pump, made by Salisbury Precision Engineering.

stub corner posts enable a large number of empty pallets to be positively stacked one upon another during storage or return transport. Advantages of strength, weight, ease of handling and cost are claimed for the new pallet.

Barron and Shepherd also make a mains powered telescopic stacker capable of handling 1 ton loads.

BOTTLE CRATE

The latest wire crate made by the Dairy Supply Co., Ltd., called the *Lynx*, has been developed to meet the demands of mechanical handling, loading and stacking.

In the new crate the ends of the division wires are welded to the boundary and the loop bottoms are welded to the crate base, forming a series of "flying buttresses." This design is claimed to give greater resistance to impact on the outside of the crate. It is also said that the bottoms of bottles cannot knock together in the crate.

A further advantage claimed for the ½ pt. bottle size of crate is that the overall area taken up by the bottles is less than that with previous crates.

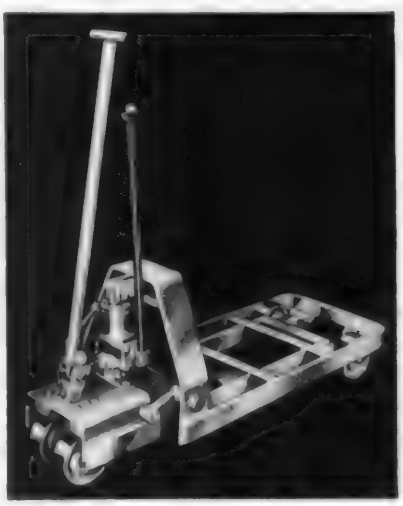
In the outer structure of the crate, single vertical wires have been replaced by continuous bridged verticals under the top boundary, eliminating the welded wires which are said to restrict entry of mechanical handling heads.

BULK HANDLING

Henry Simon, Ltd., an associate company of Simon Handling Engineers, make a speciality of bulk handling equipment for the food industry. One of their most interesting contributions in this field is the *Select-O-Weigh* system. This co-ordinates storage, proportioning and processing into a single automatic system, saving a great deal of labour and eliminating human errors. Feeding, weighing, mixing and discharge of materials is under the control of a central panel from which operations may be directed either by a single operator or by punch-card programming. The range of equipment is not standardised, each installation being individually designed for the particular project it is to serve. An article describing trends in the bulk handling of raw materials in the bakery industry, and depicting a typical lay-out in which the Select-O-Weigh system might be used, is to be found on p. 104 of the March issue of FOOD MANUFACTURE.

BULK MATERIAL CONVEYORS

A channel belt conveyor designed for the bulk handling of materials has been developed by Rowsons (Conveyors), Ltd. The belt is of conventional rubber and canvas material, but is specially moulded to a shape which is described by the manufacturers as resembling a flattened tube with the top section removed. The conveyor obviates the use of troughed idlers, using only standard parallel idlers or, where loads permit, a flat support plate relieved at intervals with idler rollers. The main head and tail pulleys are of the conventional type, as the belt assumes a flat form when running over them.



The Eccles 675 hydraulically-operated lifting truck is capable of lifting 1 ton.

The Stepmaster hand truck, made by Industrial Trucks, Ltd., may be used on stairs or level ground.

Another interesting item made by the same firm is the *Zipper* closed belt-conveyor elevator. This is also designed for the handling of materials in bulk, and is in fact a moving pipeline, materials being carried completely enclosed within the dust-tight belt. It can convey or elevate in any direction, and a single belt will operate in several planes and over considerable distances.. A number of feed points may be used on one belt, and a movable discharge may be fitted where a number of receptacles must be fed.

SCREW CONVEYORS

Screw conveyors suitable for the bulk handling of materials are made by W. S. Barron and Son, Ltd. They can be used either horizontally or at angles up to 30°. Outlets can be fitted wherever desired along the length of the trough; these can be operated

Left: **Materials are being fed from various hoppers to this conveyor which is made by W. S. Barron and Son, Ltd.**

Below: **The ALM Masterveyor conveyor, made by A. L. Marshall (Carlton), Ltd., is seen here handling jam rolls.**

manually or by screw lever, or by pneumatically operated, electrically controlled slides. In addition, discharge can be made through the end of the screw by fitting special end bearings.

The same firm also make a screw lift which will efficiently elevate a large variety of substances. The carefully designed feeder junction and expansion chamber, and the special treatment of the flights at feed and discharge ends facilitate a smooth flow of material, while the intermediate bearings offer a minimum of obstruction to ensure careful handling of the most delicate materials. Each section is readily replaceable and can be added to if extensions are desired. The split casing can be removed easily for cleaning and inspection. The lift is manufactured in four different sizes and six types, with capacities as high as 2,500 cu. ft. per hr.

BELT CONVEYORS

A range of mechanical conveyors is made by A. L. Marshall (Carlton), Ltd. The *ALM Masterveyor* is a unit band conveyor, adaptable to almost all band conveyor and elevator applications, consisting basically of driving, intermediate and tension units, the whole being supported on legs. The feet on the leg units are adjustable, enabling the band height to be varied between 2 ft. 3 in. and 2 ft. 9 in. Other heights can also be provided. With conveyors intended for use in the food industry, special provision has been made for eliminating unnecessary crevices in the equipment and the incorporation of tubular supporting structures. Special bands of tasteless white rubber, plastic or neoprene can be fitted, as well as woven wire bands, which can if necessary be of stainless steel.

To cater for the required overall length, standard intermediate units are made in lengths of 12, 9, 6 and 3 ft. The base can be skidplate, skidplate and rollers, or rollers alone, and the side channel construction enables attachments to be fitted, such as guide rails and sides, ploughs, deflectors, lane filaments, right-angle crossovers, side and delivery tables, fillets, hoppers, junctions, chutes, roller track, extensions, transfers, and so on.

Other conveyors supplied by the same firm include the *ALM Almaveyor*, suitable for applications where a short, light conveyor is needed, and the *Pacemaker* portable conveyor-elevator. The firm also supplies roller conveyors.

Mechanical belt conveyors and gravity wheel conveyors are also made by Manufacturers Equipment, Ltd. A description of their versatile *Rapistan* equipment in use in the warehouse of a food factory is given on p. 181 of this issue.

SLAT BAND CHAIN

The *Coventry* slat band chain, manufactured by Renold Chains, Ltd., is widely used for feed and take-off of food machinery such as bottle and jar fillers, cappers, etc. The chains are available in two ranges—one of stainless material

Unit Conveyor for Demerara Sugar

The use of an "F. and J." light-duty unit conveyor at the High Wycombe factory of Haven Foods, Ltd., is both an interesting and unusual one. The conveyor had, in essence, to do two jobs—firstly, to convey demerara sugar from bulk supply to a filling machine hopper; and secondly, in so doing, to provide a means of inspection, since Haven Foods, Ltd., maintain a rigid control in the hygiene and quality of their products.

First attempts with various types of conveyor proved abortive, the demerara crept under the belts on to the rollers where friction and pressure quickly turned it into a sticky mass, rather like molasses, causing, quite naturally, a "seize." On examining the "F. and J." unit conveyor (which is produced by British Automatic Conveyor and Equipment Co., Ltd.), it was found that with very little modification a standard unit could be made to do the job.

Demerara sugar, as will be seen in the illustration, is fed from the sacks through a "screen" on to the conveyor belt, which then elevates it to the hopper of the filling machine. A girl is able to carry out an inspection before the sugar passes under the electronic metal detector, prior to its falling into the filling machine hopper.

Modifications to the conveyor were special rubber "seals" at each side and along the length of the belt, which kept the sugar from seeping away, and the provision of a special "take-away" chute and hopper at the filling machine end which accepted any surplus sugar that was left adhering to the belt after passing the filling machine hopper orifice.

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highly resistant to corrosion, the other of case-hardened mild steel for use under dry conditions such as are usually encountered on packaging machinery. Each range covers slat widths from 3 to 7½ in.

Renold chains also find many uses in such units as bucket elevators and overhead rail conveyors. A considerable number of attachments, including spigot pins, trolleys for use on overhead rail conveyors, and bi-planar links to enable the chains to be used in more than one plane, are available.

AUTOMATION OF CONVEYORS

A system of full automation in conveyors has now been developed by A. and C. Jenner, Ltd. This comprises a fully automatic sub-circuit conveyor connected in parallel to the main conveyor. There are limitless ways of doing this and there can be many such sub-circuits on any conveyor system.

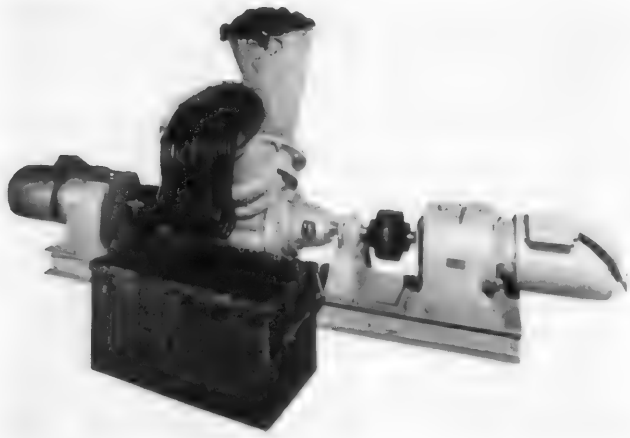
The main conveyor may be carrying almost any type of goods, or may be part of any continuous process line. When, say, an operator needs to do work on these goods, he merely teledials the quantity he requires and they are automatically diverted from the main conveyor to his station. As he completes his operation, he dials them back to the main conveyor, again in any number. The tele-controls for the diversion of items from the main line and for their re-dispatch to it are separate and independent, and can be sited near together or far apart. An automatic lift can also be installed in the system, so that it is equally applicable to multi-floor layouts. The firm state that the computations of applications of the system are almost infinite where any form of control of numbers is required.

ELECTRIC MOTORS

Many—perhaps most—mechanical handling appliances in the food industry require the use of electric motors. Electropower Gears, Ltd., supply a number of these, including foot and flange-mounting geared motors and gearboxes from $\frac{1}{16}$ to 300 h.p. Their range includes constant horsepower geared motors and electronic control motors, both of infinitely variable speed. Contra-rotating geared motors with particular application to mixing machines are also marketed. Other units available from this firm include high-speed geared motors, *Slo-Rev* units with ratios up to 2 million to 1, and worm-geared motors from $\frac{1}{8}$ to 2½ h.p.

A large range of electric motors is also supplied by the British Thomson-Houston Co., Ltd. Their *Type CF* variable-speed commutator motors are suitable for driving many types of machine, including pumps and conveyors. Speed is controlled by a separate regulator, giving remote control without additional gear at any speed up to 15 to 1, with infinitely fine control.

For duties where single-phase motors are required, B.T.-H. provide capacitor motors from $\frac{1}{16}$ to 1½ h.p. These *Type BC* motors are divided into two main groups —namely, the capacitor-start induction-run machines and the



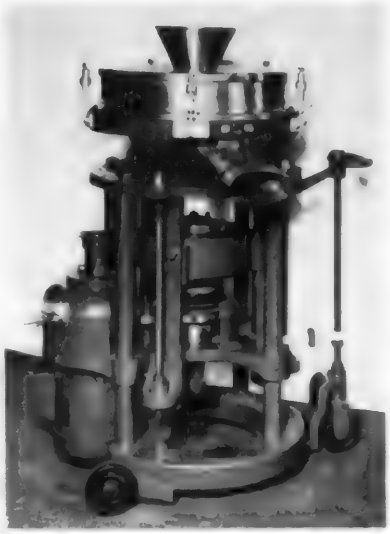
Two Electro-power gears, driving a Comet pump extruding cold liquorice.

permanent split-phase capacitor motors. They are suitable for all duties requiring operation over long periods and where maximum general efficiency is essential. The capacitor-start induction-run machines are also admirably suited for applications where frequent stopping and starting are required, amongst which may be mentioned the driving of refrigerators and other compressors under automatic control.

Photo-electric relays and control units are also supplied by B.T.-H. Typical applications include register control in bag-making and packaging machines. Accuracies of $\frac{1}{32}$ and $\frac{1}{64}$ in. are obtainable with their G/N5 and G/Q2 equipment respectively. The photo-electric relays are also suitable for such applications as the counting of bottles or other containers on conveyor lines.

MECHANICAL SIEVES

High-speed separators and strainers designed to facilitate the rapid handling of materials are featured by Russell Constructions, Ltd. The machines operate on the basis of high-frequency gyratory vibration, and extremely high output rates are claimed. Thus, the *High-Speed Strainer*, with a screen area of only 2½ sq. ft., can handle materials at an output rate of up to 1,200 gal. per hr., and can function with the finest screens. A new and improved version of the *Separator* has a capacity of up to 15,000 gal. per hr., and is self-cleaning and automatically rejects



This sieving and straining unit has a variable speed. It is made by Russell Constructions, Ltd.

oversize material. It has been successfully applied to the straining of whey liquor, starch liquors, coconut oil, palm kernel oil, raw sugar juice, and other liquid food commodities.

A new variable-speed development of the *Stand* sieving and straining machine is also being produced by the same firm. This allows of various speeds of operation from 1,000 to 3,000 r.p.m., and has been used for a large number of food products.

▶ British Cellophane, Ltd., have issued a booklet intended as a general introduction to the properties and uses of the polythene films available in the range they produce.

Blending and Packing Tea

(*Concluded from page* 188)

by low-power electric motors, into two reserve hoppers immediately above the huge, rotating tea-blending drums. Each elevator serves an individual hopper.

In these reserve hoppers over the blending drums the various qualities and quantities of tea—fed into the hoppers by the elevators—are assembled for blending. When ready, the tea drops into the rotating drums which blend it to the requisite mixing.

Situated between the two reserve hoppers is a small room staffed by skilled tea-tasters, who are able to sample tea taken straight from the blenders and brewed on the spot. This means that if any mixing in the blender is not to the required standard the packing can be halted before despatch.

The Redler *en masse* system, specifically designed for the purpose, allows the blended tea to be drawn off from the drums in three ways. First, in can be channelled into chests for bulk despatch, and secondly into special canvas bags for short term factory storage.

The third method is that it can be drawn from each of the two blending drums into individual twin elevators—each drum feeding a separate twin-elevator system, so that when one drum is stationary, the other continues to keep the tea moving.

These twin-elevator shafts feed a further conveyor system, which carries the blended tea into various hoppers located above the individual packet-filling machines, which provide the final link in the chain of operations. The conveyors can be used to make the tea flow in either direction in order to suit the requirements of the filling machines.

The Redler system of elevating and conveying—silent in operation, requiring only low-power electric motors, dust free and demanding the minimum of maintenance—has proved completely satisfactory. It can be controlled by one man from a central control panel and, for a single floor plant, has certainly proved its worth.

Rapid Techniques in Industrial Microbiology–2

By S. M. Charlett, F.R.M.S.

In Part 2 of this article, the author describes other rapid methods of estimating bacterial numbers, and discusses the interpretation of results. He also describes several stains which have proved useful for the type of work described.

The Frost little-plate method for counting viable bacterial numbers

This technique was devised by Frost[7] as a rapid means of estimating the numbers of living bacteria in milk samples, with particular emphasis on field work. The method itself is quite straightforward and is fundamentally a modification of the normal plate count, the actual rapidity of the determination being due to microscopic observation of a special plate culture so that colonial development can be detected at a comparatively early stage.

There is no special equipment needed for the technique, although it is useful if a number of slides are prepared for use by outlining on each two separate squares of sides 2 cm. long. This allows the slides to be sterilised and avoids infection when the squares are outlined in grease pencil or crayon, as suggested in the original technique.

Once again the field of the microscope to be used must be rendered standard. Where possible, that is where the instrument is fitted with these, a 2/3 objective should be used in conjunction with a ×6 eyepiece, which will usually give an approximate field size of 2 mm. dia. In any case, the fields size should be accurately measured, using a 2/3 objective and a stage micrometer.

The technique itself is simple. The marked slides should be sterilised by passing them through a flame several times, and then allowed to cool inside an empty, sterile petri dish; 0·01-0·05 ml. of the liquid sample being examined should be deposited at the centre of each of the marked squares. Using a flamed wire loop, as described earlier, an equal quantity of melted agar of the required kind (see above on media types) is deposited beside, but not touching, the sample. With a flamed needle the agar and sample are thoroughly mixed together and then spread over the 2 cm. square as evenly as possible before the agar sets. This must be done very rapidly.

The slides should then be incubated at 37°C. for 8 hr. This incubation should be done in either a moist incubator, the slide being kept in the sterile petri dish, or else a small piece of sterilised blotting paper moistened with sterile water should be placed inside the dish.

After incubation, the slides are dried in a hot air oven at 95°C. for 10 min. The dried preparations are then stained with a simple stain of the methylene blue or thionin type for 10 to 15 min., washed, and again dried in the hot air oven for 10 min.

The slides are now ready for examination. The field size with a low power objective as described above is first determined. The stained slides are then placed under the microscope and the number of stained colonies appearing in 25 random fields in each square is counted. The question of random fields has often been criticised, and the writer feels that this criticism is just. His own technique for overcoming the errors likely to occur in the selection of random fields is to select the fields as follows. Focus the microscope on the left-hand edge of the square to be counted and locate the centre of this edge. Now count 13 fields directly across the square, 6 each side of the centre and one at the direct centre. Refocus the instrument on the top edge of the square, and again locate the centre. Count 12 fields vertically downwards, 6 each side of the centre. Thus a total of 25 squares will have been counted, and the pattern so adopted may be repeated accurately for subsequent counts and will allow reasonably accurate standards to be established.

The total number of fields should be averaged to give a number of colonies per field. From this the total count of viable bacteria per ml. of the original sample may be calculated as below:

Viable bacteria per ml. = m × c × d.

Where: m = microscopic factor — Area of marked square / Area of field.

c = number of colonies per field.

d = reciprocal of the quantity of sample taken for count.

Once again all results should be recorded for future reference.

Dye reduction methods of testing

The dye reduction methods of testing are vastly different from other techniques. Where the direct microscopic method measures the number of bacterial cells in a sample, and the little plate method measures the numbers of living bacteria, the dye reduction methods measure the amount of *bacterial activity*. At least, this is the ideal. In practice, a large number of factors have considerable effect upon the reducing effect, and must be considered when interpreting such a test. The writer has, however, used them on many occasions, in conjunction with either or both of the other tests described here, for routine examination of numerous samples of varying origins. Perhaps one point about reduction tests worth some consideration is that where the presence of coliform and associated types of bacteria is suspected a very short reduction time is good supporting evidence.

The fundamental principle of dye reduction tests is, as the title implies, the decolorisation of, or

alteration in colour of, certain specific dyes. The fact that certain dyes were decolorised by milk was noted by Duclaux,[8] and this fact was shown to be a possible index of keeping quality by Nasser and Wechsberg.[9] But it was not until the work of such later workers as Jensen,[10] Fred,[11] Thornton,[12] Thomas and Ralph,[13] and many others whose work cannot be mentioned here, that the value of the test in assessing the quality of milk samples was realised. Many dyes were suggested, but methylene blue seems to have been the favourite, and in 1935 Wilson[14] published the most comprehensive paper on the Methylene Blue Reduction Test in which its value was established, subject to certain influencing factors which may be considered later.

Within recent years a substitute for methylene blue has been proposed in the form of resazurin. For some time this found a measure of favour, but the tendency is now to revert to the older methylene blue.

The methylene blue reduction test

Originally designed, as noted above, for the determination of milk keeping quality, this test has been employed by many workers in other fields for the estimation of bacterial quality, both for materials and for plant control work. It is based on the reduction of methylene blue in aqueous solution, and the standard method for milk may be easily adapted for other types of sample, such as plant rinses, flume water samples, suspensions of such raw materials as milk and egg powders, and many more.

The reagents and apparatus for this test have been fully outlined by Wilson,[14] but briefly these consist of the following:

(1) Hard glass test tubes 6 in. × $\frac{5}{8}$ in., conforming to B.S.I. specification number 625. Marked at 10 ml. level.
(2) Rubber bungs for closing the above.
(3) Pipettes: 10 ml. for test liquid; 1 ml. for the dye solution.
(4) Freshly prepared aqueous solution of methylene blue. This should be prepared from methylene blue tablets supplied by B.D.H. One tablet should be dissolved in 200 ml. cold distilled water, a further 600 ml. of distilled water added, and the solution then stored in a cool dark place. It should be renewed once a week.

The technique is quite simple. The liquid under test is pipetted into six of the test tubes specified above, and brought up to the 10 ml. level; 1 ml. of the dye solution is added to each of these tubes, bungs are inserted, and all tubes inverted six times to ensure mixing of the tube contents. The tubes are then placed in a 37°C. incubator, together with a control tube to which no dye solution has been added. The tubes should be examined at 30-min. intervals, and any reduction taking place should be noted. If reduction does occur, it is useful to record the time of onset and, if possible, the time at which the dye has been completely decolorised. A useful guide to the onset of reduction may be obtained by comparison with a test tube prepared as for the test, but which is kept in a refrigerator to inhibit bacterial activity and thus prevent the reduction taking place.

In the original method for milk samples it was specified that the tubes should be kept in a standard water-bath at 37°C. ±0·5, but the writer has always found this unnecessary, and that consistent results are obtained by the use of an incubator.

In certain cases where there is a tendency for some separation of portions of the liquid, such as in the examination of milk, or the sedimentation of some powders, the half-hourly inspection for signs of reduction should be accompanied by three inversions of each tube to ensure fairly even distribution of the material.

The points to note in this test are that all the glass ware should be sterile before use, as should the bungs of course, and that the exposure of the tubes to light is kept to an absolute minimum, as it has been shown that light has a definite effect upon the reduction time of methylene blue.

The resazurin reduction test

The fact that resazurin can be substituted for methylene blue as a suitable indicator in reduction tests has been recognised for some time, contributions having been made by such workers as Johns and Hawson,[15] Anderson and Wilson,[16] Galesloot,[17], Trembath,[18] and Schubert and Nagle.[19] This test has, however, tended to be rather less popular in recent years, and many workers are reverting to the original methylene blue indicator. Higginbottom[20] describes the application of dye reduction tests, including resazurin, in the determination of the quality of dried milk, whilst Thomas[21] has outlined a technique for the application of the test to the estimation of the cleanliness of milk churns, this being modified by Davis and Watson[22] to a more reliable test, but hardly a rapid one, as it involved a 24-hr. incubation period for the rinse water prior to testing the reducing abilities of this.

The test has been modified by various workers, and it now seems that an incubation temperature of 18°C. is the best, and is accepted as standard for milk testing. Once again, however, the writer has found that 37°C. incubation gives more rapid results without loss of accuracy in routine test on rinse samples and others.

The apparatus for the test is identical to that required for the methylene blue test, and an indicator solution of resazurin is prepared as below:

Dissolve 0·1 g. of resazurin in 200 ml. of glass distilled water. Boil gently, or steam in a Koch steamer, for 30 min. Cool, *store in a refrigerator*. For use, dilute 1 ml. of the dye solution to 10 ml. with glass distilled water to give a solution of 0·005% strength.

Where tablets of the dye are used, dissolve one tablet in 50 ml. cold glass distilled water for use. Prepare fresh daily.

The technique of the test is similar to that of the methylene

blue test, in that the liquid under test is pipetted into the test tubes up to the 10 ml. mark and 1 ml. of the dye solution added. The bungs are inserted and the tubes inverted to mix the dye solution and test liquid, and the tubes are then incubated at the desired temperature. At 37°C. the tubes are examined for signs of reduction at 15 min. intervals, whilst at 18°C. examination should be made at 1 hr. intervals. The difference between the tests is in the method of estimating reduction. In the methylene blue test the test tubes are compared with blank tubes, but in the resazurin test the tubes under test are compared with *standard discs*, each of which indicates a definite colour change and which ascribes to that change a definite *resazurin number*. The numbers, together with the gradings given to milk which produces such a colour in 1 hr. at 37°C. or 3 hr. at 18°C., are shown below:

Colour.	Disc. *Number.*	Milk Grading.
Blue	6	Excellent
Lilac	5	Very good.
Mauve	4	Good.
Pink-purple	3	Fair.
Purple-pink	2	Poor.
Pink	1	
Colourless	0	Bad.

THE INTERPRETATION OF RESULTS

The interpretation of results obtained from any of the above tests rests upon three basic factors:

RECORDS
STANDARDS EXPERIENCE

each of which is dependent upon the other two. The maintenance of records is an essential, but unfortunately often neglected, part of control laboratory routine, without which the establishment of any form of standard is quite impossible. Therefore it is obvious that in the earlier stages of application of the techniques outlined here a good deal of work will be necessary to build up comprehensive records on which to base any judgment of results, and with which to establish some form of standard for the direct count, little plate count, or reduction figure for any given sample, whether it be a plant sample, raw material, or finished product. By this means the interpretation and evaluation of subsequent results is rendered increasingly simpler as records and experience increases. The few notes given below on the precautions necessary in the interpretation of the results of the individual tests are only intended to assist, and should not be accepted as hard and fast rulings, but should rather be tempered with the light of experience.

The direct microscopic count of bacteria. As has been noted, this technique is a rapid way of determining total numbers of bacterial cells present in a given sample. The main drawback is that the whole of the bacterial content is estimated, living and dead cells together, as opposed to the viable count, in which only the live cells are detected. The main advantage of the technique is that it gives a very direct indication of the quality of the sample, and often in the case of materials will give some idea of the sanitary conditions of manufacture. For example, a sample of milk powder may give a very low viable count, but a very high direct microscopic count, thus indicating the use of a poor grade milk in the preparation of the powder or that the plant was in a very poor state of cleanliness. In the case of samples obtained from plant checks—*i.e.*, rinses or flow samples—the plate count technique takes considerable time to give results, whereas the direct count gives very rapid indications of any undue sudden increase in the actual numbers of bacterial cells, with the possible implication that there is a fault somewhere in the plant which may need attention. Such a fault may be a build up in a pasteuriser, or in another piece of heat-treatment equipment, which if left undetected for the period required for a plate count can do untold damage to the sanitary state of the material passing through the equipment. The applications of such a technique are very wide; the writer[23] has used it for the control of plant cleaning operations, and it has been used also for the control of the production of various citrus fruit juices,[24, 25] in the control of the production of dried egg and dried milk,[26, 27] in the examination of butter samples for mould contamination,[28] for the detection of incipient spoilage in stored poultry meat,[29] and in the control of vegetable production.[30]

The most important points to remember in connection with this technique are that records of all readings should be kept, so that subsequent counts may be compared, and that staff should be adequately trained in the making of direct counts, and in the interpretation of any variations which occur.

The little plate technique. In this the counting technique is similar to the direct method, whilst the result is similar to that given by the normal plate count technique, with the advantage that the period of incubation is shortened from a matter of 48 hr. to about 8 hr. The disadvantage as compared with the direct microscopic count is, of course, the fact that incubation is necessary, and thus it can only be used as a quick check, but will not give results in a sufficiently short time to allow the rectification of faults, as will the direct count.

The test is quite valuable in the quality testing of comparatively perishable products which may be filled one day for dispatch the next, and will serve to detect any very heavily loaded product, which will of course be in a state of incipient spoilage. Additionally, the technique is useful for preliminary examination of raw material which, as so often happens nowadays, are delivered late in the day and are required for use the following morning.

The essentials of the test are to ensure that the apparatus used is all strictly sterilised, and that care is taken to make each test a replica of the previous in technique, and workers should be adequately trained. Again, the keeping of proper records must be emphasised.

The reduction tests. These are, as has already been noted, methods which measure bacterial activity

rather than numbers, and from this one may see the main drawback of the methods. Organisms of the coliform types are very active reducing bodies, whereas many other common types of contaminating organisms are not very active reducers. Therefore, the test depends far more than any other upon the training of the workers, and their knowledge of the typical organisms likely to be present with their reducing abilities. The worker will have to use his common sense in interpreting the effects of organisms, chemical condition of the material being examined, the conditions of manufacture, and many other factors which may affect reduction times and which may be peculiar to one particular case.

Here, again, will be seen the importance of maintaining adequate records supplemented by notes upon the affecting factors likely to be met. For instance, if samples of fluming water are taken from a vegetable manufacturing plant over a reasonable period of time, it will be possible to subject such samples to reduction tests and to establish an average time, plus a high and a low time limit. With sufficient evidence of such a nature any variation of time below the accepted low limit may well be viewed with sufficient suspicion to cause further investigation. This emphasises the main advantage of the reduction methods of testing, that an indication is given that a change has occurred, be it chemical or bacteriological, and that further investigation is necessary.

General. The ideal is, of course, to combine all three of the methods described here until sufficient data has been accumulated to indicate that one method may be relied upon to a greater degree than the others, although it would still be best to continue the use of more than one of the methods simply as a check. In addition, it is a wise move to confirm such techniques by the regular use of more normal bacteriological methods, simply from the point of view of confirming results and increasing confidence in the methods.

None of the techniques described here is offered as a substitute for the more regular and accurate techniques of analytical bacteriology; they are simply suggested, as the title implies, for the saving of time in the spot checking of plant and materials for excessive bacterial content which, if allowed to go unchecked, may cause the manufacturer or consumer untold waste and trouble.

STAIN FORMULÆ

Simple methylene blue

Methylene blue (B.D.H. Standard Stain) ..	1·0 g.
Distilled water	100·0 ml.

Dissolve and filter.

Stain smears for 1 min. in this solution. In the case of a greasy or fatty smear, defat with xylene and alcohol before staining.

Newman's methylene blue

Methylene blue (B.D.H. Standard Stain) ..	1·0 g.
Glacial acetic acid ..	6·0 ml.
Tetrachlorethane	40·0 ml.
Distilled water	54·0 ml.

Dissolve the stain in the alcohol and then add tetrachlorethane, the solution may be warmed gently to not more than 70°C. to completely dissolve all traces of stain. Cool solution to room temperature and add the glacial acetic acid. Filter, and store in well-closed containers. When stain is used ensure that the outside of the container is well wiped as the stain has a tendency to creep, due to the low surface tension, and make the outside of the container unpleasant to handle.

Stain prepared smears for 30 sec. Bacteria should be dark blue on a pale ground. If necessary, differentiate with alcohol. This stain solution defats, fixes and stains in one operation.

Charlett's double stain

Solution A.

Methylene blue (B.D.H. Standard Stain) ..	1·2 g.
Alcohol 95%	54·0 ml.
Tetrachlorethane	60·0 ml.
Glacial acetic acid ..	6·0 ml.

Warm alcohol and methylene blue together until dissolved, do not allow to rise above 70°C., add tetrachlorethane. Cool to room temperature and then add the glacial acetic acid.

Solution B.

Basic fuchsin (B.D.H. Standard Stain) ..	1·0 g.
Alcohol 70%	200·0 ml.

Dissolve and filter.

To use the stain:

Add 100 parts of solution A to 50 parts of solution B and mix thoroughly. Keep in a bottle with a fitted dropper and rubber teat, or in a Coplin jar with a close-fitting lid. Prepare fresh each day.

Apply mixed stain to prepared smear for 10-12 sec., then wash with distilled water until smear appears pale pink. Under oil immersion the bacteria appear deep blue on a pale pink ground.

Gram's stain

Crystal violet (*Hucker*).

Crystal violet (B.D.H. Standard Stain) ..	2·0 g.
Ethyl alcohol	100·0 ml.

Dissolve and filter. Add

Ammonium oxalate ..	0·8 g.
Distilled water ..	100·0 ml.

Iodine solution (*Lugol*).

Iodine (resublimed) ..	1·0 g.
Potassium iodide ..	2·0 g.
Distilled water ..	100·0 ml.

Dissolve potassium iodide in 10 ml. of water and add iodine. The iodine will dissolve rapidly in the strong iodide. Add remaining water.

Counterstain (*Kopeloff*).

Basic fuchsin (B.D.H. Standard Stain) ..	0·1 g.
Distilled water ..	100·0 ml.

Dissolve and filter.

Technique. — Cover prepared smears with crystal violet solution for 2-3 min.

Wash off crystal violet with iodine solution, cover smear with further iodine and leave 2 min.

Wash off iodine with distilled water, drain off excess water, but do *not allow smear to dry*.

Decolourise smear with a mixture of equal parts ether and acetone until almost no more colour comes away from smear; this will need experience to judge properly without the danger of over decolourising. Counterstain with fuchsin solution 5-10 sec.

Gram positive bacteria appear blue-black, and Gram negative bacteria red.

(*Concluded opposite*)

A Photorefractometer for Automatic Process Control

A NEW type of refractometer for use in connection with the automatic control of processes in tomato pulp evaporation has been described in Russian literature.[1] The instrument differs from other types of refractometers, since the light does not pass through a prism containing the solution, but travels through the prism before entering the solution.

Light passes through a glass prism 1 (Fig. 1) and is incident upon the boundary between the two media, *i.e.* the glass and the trial solution. Since the optical density of the solution is less than that of the glass, the angle of refraction β is greater than the angle of incidence α. This angle of incidence α is so chosen that, with insufficient concentration of the solution, the ray of light is completely reflected internally. An increased percentage of dry material brings about an increase in the optical density until, at a certain concentration, refraction takes the place of reflection, and the light ray penetrates the solution. This ray of light enters the light probe 2 and travels to the photoreceiver 3, where the amount of light entering is recorded. The

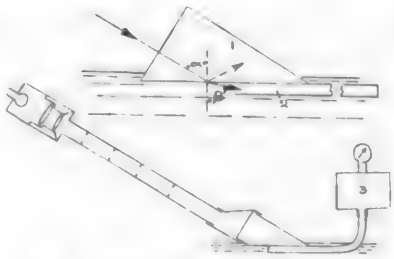


Fig. 1. The new photorefractometer in principle.

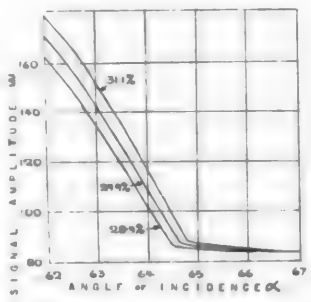


Fig. 2. Results of experiments with varying concentration of tomato pulp.

incident angle α may be used for preliminary tuning to obtain a maximum signal near to the required concentration condition.

A 6 volt, 20 watt electric bulb is used as the light source, with a lens to focus the light and direct it through a tube of length 350 mm.; the tube has a series of diaphragms which reduce the amount of light reflected from the wall of the tube. The inoperative surfaces of the prism are coated with non-transparent varnish to prevent extraneous light from entering the prism. After refraction, the pencil of light enters the light probe, whose ground glass walls effectively transmit the light to the photoreceiver without great loss. The photoreceiver uses 19 cascade photomultipliers with a stabilised current supply at 2,100 volts; the final photomultipliers operates a mirror galvanometer, and the angle of rotation of the galvanometer may be used to regulate the process.

It is essential to use a stabilised voltage supply, and additional errors are introduced by temperature changes in the solution; this point requires further investigation.

Laboratory tests have shown that in the vicinity of the prism there is some time lag in the change of concentration of the solution, but under practical conditions the discrepancies due to this are small compared with those due to temperature changes.

The results of preliminary experiments with varying concentrations of tomato are shown in Fig. 2. The graph shows the change of signal amplitude with angle of incidence for different concentrations. There is a sudden reduction in signal as the angle of incidence increases, and it is clear from the graph that the instrument may be adjusted to obtain a maximum sensitivity to change in concentration within the required working range. It has been found that the allowable percentage of dry material in the tomato pulp may be controlled within $\pm 1\%$.

P. G. MORGAN.

REFERENCES

References Nos. 1-6 were published with Part I of this article, which appeared in the April issue of FOOD MANUFACTURE.

7. W. D. Frost. *Internat. Ass. Dairy and Milk Inspectors*, 1920, 243.
8. E. Duclaux. "Etudes chimique et microbiologique le lait." 2nd ed. Paris. Baliere et fils. 1894.
9. M. Nasser and F. Wechsberg. *Munch. med. Wschr.*, 1900, **47**, 1261.
10. O. Jensen. *Zbl. Bakt. IIte. Abt.*, 1907, **18**, 211.
11. E. B. Fred. *Zbl. Bakt. IIte. Abt.*, 1912, **35**, 391.
12. H. F. Thornton. *J. Bact.*, 1929, **18**, 293; *J. Dairy Sci.*, 1930, **13**, 221.
13. S. B. Thomas and D. E. Ralph. *Welsh J. Agric.*, 1935, **11**, 209.
14. G. S. Wilson. *Med. Res. Council Rep.*, 1935, 206.
15. C. K. Johns and R. K. Hawson. *J. Dairy Sci.*, 1940, **23**, 295.
16. E. B. Anderson and G. S. Wilson. *J. Dairy Res.*, 1945, **14**, 21.
17. T. E. Galesloot. *Ned. Melk. Zuiveltijdschr.*, 1948, **2**, 70.
18. R. H. Trembath. *Aust. J. Dairy Tech.*, 1950, **5**, 3.
19. W. F. Schubert and P. M. Nagle. *Queensland Agric. J. Sci.*, 1951, **8**, 29.
20. C. Higginbottom. *J. Dairy Res.*, 1948, **15**, 280.
21. H. Thomas. *Proc. Soc. Appl. Bact.*, 1941, p. 47.
22. J. G. Davis and E. Watson. *Dairy Ind.*, 1943, **8**, 415.
23. S. M. Charlett. *Dairy Eng.*, 1955, **72**, 266; *Canning and Packing*, May, 1955.
24. E. R. Wolford. *U.S. Dep. Agric. agric. Res. Serv. Bur. Agric. industr. chem. A.I.C.* 365, 15 pp., 1953.
25. K. M. Rowell. *Food Tech.*, 1954, **8**, 459.
26. C. K. Johns and H. L. Berard. *Food Res.*, 1944, **9**, 396.
27. W. R. Worth. *J. Assoc. Off. Agr. Chem.*, 1945, **28**, 426.
28. K. Vas. *Kiserlet Kozlem. Rep. Hung. Agric. Sta.*, 1939, **32**, 25.
29. C. Lind. *Konserves*, 1954, **12**, 5.
30. J. O. Mundt. *Food Res.*, 1956, **21**, 21.

REFERENCE

1. B. F. Dikii and B. P. Ivashenko. *Zavodskaya Laboratoriya*, 1957, **23** (9), 1124.

Fundamental Aspects of the Dehydration of Foodstuffs - 1

Abstracts from the Aberdeen Conference

A conference was organised at the University of Aberdeen from March 25 to 27 last on the Fundamental Aspects of the Dehydration of Foodstuffs. We publish below a series of abstracts of the principal papers read at the conference, which was organised by the Society of Chemical Industry.

PLANT STRUCTURE AND DEHYDRATION

By R. Gane and H. G. Wager (Low Temperature Research Station, Cambridge)

THE structure of a typical plant cell and of plant tissues was described and the problems that arise in the dehydration of plant tissues were discussed in relation to their structure.

Heating destroys the enzymes which produce the autolytic changes that occur on the death of a cell, the more obvious ones being alterations in colour and odour. The turgor is lost and liquid is forced out into the intercellular spaces and in some cases right out of the tissues. The natural crispness of the tissue is lost. If starch is present it is dispersed and gelatinised. During heating, solutes are leached out of the cells into the cooking liquor. Penetration of solutes foreign to the cell, and hence some control of the environment of the cooked tissue, become possible.

Scalding of tissues before drying seems to allow the tissue to soften when cooked after drying, to prevent off-flavours and colour changes, to introduce compounds into the tissue to thus partially control its chemical environment and to sterilise the tissue.

The temperature of the drying material must be kept low, especially at intermediate water contents, to minimise the non-enzymatic browning reactions. Waterlogging of the air spaces affects the rate of loss of water from the inner zones, and the tissue must therefore be cut into relatively small pieces for drying to be completed within a reasonable time. The loss of volatile flavouring constituents is a major unsolved problem. Changes in the physical properties of the cell wall, pressure on scalded vegetables and over-cooking must be avoided. The drying temperature must not be so low as to allow the growth of bacteria.

The dried vegetables are unstable and the various deteriorations that occur during drying continue during storage at a rate controlled by the moisture content and temperature. Some measures used to minimise some of these changes were described.

THE STRUCTURE OF THE ANIMAL TISSUES AND DEHYDRATION

By J. Brooks (Low Temperature Research Station, Cambridge)

The part played by structure in the dehydration of animal tissues was discussed.

Spray-dried whole egg manufactured without any preliminary treatment has a poor flavour and a low foaming power. There is a further loss of aerating power during storage as the solubility of the powder is decreased. Flavour and solubility changes during storage can be retarded by lowering the water content from the normal 4-5% to 2%. Lowering the *p*H of the liquid before drying by the addition of acid also helps. These changes during storage are caused by the reaction of glucose with the amino groups of proteins and kephalins, and a greatly improved product is obtained by destroying glucose before drying by fermentation with either yeast or glucose oxidase. The loss of foaming and baking properties can be prevented if 10-15% of sucrose or lactose are dissolved in liquid whole egg before spray-drying, and there is little subsequent loss during storage as long as the water content does not exceed 3·5%. The smaller the average particle size, the better are the baking properties of the powder.

After reconstitution, dried meat prepared by the process developed at the Low Temperature Research Station, is very similar to cooked minced meat except that it has a slightly inferior texture. Juiciness and texture are associated with the amount of water absorbed by the dried meat on soaking. Water absorption may be regarded as an index of quality.

Large pieces of uncooked meat such as chops and steaks are prepared by freeze-drying and the vacuum contact plate process. Freeze-dried meat has a dryer and tougher texture than the frozen control. Deficiencies in texture have been attributed to the loss of water holding capacity by the muscle proteins and protein denaturation during drying has been suggested as the cause of this loss. These and other suggestions regarding the change in texture were discussed.

THE SORPTION OF WATER BY HAEMOGLOBIN

By M. H. Cardew and D. D. Eley (University of Nottingham)

An attempt to study the adsorption isotherm of haemoglobin at very low relative vapour pressures, using successive determinations on one sample in a McBain balance, was unsuccessful because of the slow rate of approach to equilibrium. The adsorption isotherm was therefore studied in the range of relative vapour pressures 0·0004 to 0·80. Twenty points were used to delineate each isotherm from the dry side and a fur-

ther twenty from the wet side. Determinations were made at 30 and 40, for specimens of freeze-dried and alcohol-denatured haemoglobin. The specimens were sealed in a range of tubes containing sulphuric acid solutions to give the required vapour pressures of water, and 7 months allowed for equilibrium. Even so, the adsorption and desorption curves failed to coincide, a definite hysteresis resulting. The B. E. T. theory fits the adsorption results rather better than the desorption results and the monolayer values at 30 and 40 are virtually the same, 0·00306 moles water/g. haemoglobin for denatured ox haemoglobin and 0·00319 moles water/g. for freeze-dried ox haemoglobin. Values of the heat content and entropy of the adsorbed water (both differential and integral values) have been determined for the adsorption curve.

THE PROPERTIES OF AIR IN RELATION TO DEHYDRATION

By Prof. A. W. Scott (Royal College of Science and Technology, Glasgow)

Available data on the properties of dry and humid air were reviewed. Reliable data are available for the properties of dry air and of steam. However, the properties of humid air have not been studied exhaustively and since neither air nor water vapour behave as ideal gases, a certain amount of conjecture has still to be used in humid air calculations.

The properties normally required in industrial calculations are specific heat and enthalpy and also specific volume, all commonly expressed per lb. of dry air. In addition, the more detailed scientific aspects of dehydration involving the study and correlation of mass- and heat-transfer aspects required a knowledge of such properties as viscosity and thermal conductivity.

Available data on properties of air and water vapour were reviewed, and limitations in the calculation of the properties of mixtures of air and water vapour were discussed.

MOISTURE EQUILIBRIUM AND THE DETERMINATION OF WATER CONTENT OF DEHYDRATED FOODS

By F. Stitt (Agricultural Research Service, U.S. Dept. of Agriculture, Albany, California)

Knowledge of the vapour pressures of foodstuffs as a function of water content and temperature is basic to the design of dehydration equipment. Such information is also needed in connection with the handling, packaging and storage of dehydrated products.

The water vapour pressure of a material as a function of its moisture content at a specified temperature constitutes a sorption isotherm. Various methods used to obtain moisture equilibrium data for foodstuffs were discussed.

The failure to equilibrate to the same moisture content at a given R. H. in adsorption and desorption is called hysteresis, and is widely encountered in materials of high molecular weight. The magnitude of hysteresis effects is governed primarily by the composition of the material, but also depends on the temperature and pre-treatment of the sample. Although the absolute vapour pressure changes rapidly with temperature, the relative vapour pressure is comparatively insensitive to small temperature changes. The effect of the pre-treatment and method of drying on sorption isotherms is discussed. For products such as dehydrated vegetables in which the raw material is inherently rather unhomogeneous in composition, sorption isotherms cannot be expected to be precisely reproducible from one lot of material to another. Providing interactions among the components have only minor influence on their moisture equilibrium properties, the sorption isotherm for any product is expected to be a weight average of the isotherms of the constituents. The sigmoid character of the curves is most pronounced and the moisture content at very low humidities is the greatest for those foods whose dry solids are richest in protein, starch, or other high-molecular-weight polymer, and least for foods high in soluble solids.

Moisture equilibrium in pure components, thermodynamics of sorption and sorption theories were discussed.

The advantages and limitations of the vacuum-drying, entrainment distillation, Fisher volumetric method, nuclear magnetic resonance method and dichromate oxidation method for the determination of water content were discussed in detail.

RATE-CONTROLLING FACTORS IN FREEZE DRYING

By H. Kramers (Laboratorium voor Fysische Technologie, Technische Hogeschool, Delft)

In freeze drying, water is removed from a product in which the water is in a frozen state. A layer of the frozen material is deposited on a solid carrier material through which the heat of sublimation is to be supplied. On evaporation of the ice, its surface recedes in the layer, and the water vapour has to be transported through the part of the layer which has already been dried. The vapour then passes through an evacuated space to, *e.g.*, a surface condenser, on which an ice layer is formed as the evaporation proceeds.

In such a process, heat, either sensible or latent, is transported from a higher to a lower temperature. The relationship between the total temperature difference and the heat flow (which is proportional to the rate of evaporation) is governed by the resistances to the flow of heat.

The various individual resistances which were discussed in some detail are: heat supply to the frozen material, transport of heat in the frozen material, flow resistance between dry material and condenser surface, resistance of the dried material to water-vapour flow, heat conduction through the ice layer on the condenser, and heat transfer from the condenser wall surface to the cooling medium.

An account was given of some experimental work on the structure and the resistance to vapour flow of freeze-dried materials. Finally, some aspects of continuous freeze drying were discussed.

BOUND WATER IN FOODS

By J. Kuprianoff (Karlsruhe, Germany)

The role of water in food was described and also the forms in which it may be bound. The possible effects of decreasing water content and the problem of the reversibility of changes were discussed and some examples were given of biochemical, biological and technological reversibilities where an optimum water content gives maximum reversibility. Total water content cannot be separated into free and bound water and an explanation was given for this.

The freezing method was suggested as the most accurate procedure for determining unfreezable water, especially when this is related to the protein content of the food and not to its total solids. A summary of recent work was given showing that in protein foods there is an almost stoicheiometric relationship between unfreezable water content and protein nitrogen of two molecules of water to one atom of protein nitrogen.

A STUDY OF EVAPORATION AND DIFFUSION PROCESSES IN THE DRYING OF FISH MUSCLE

By A. C. Jason (Torry Research Station, Aberdeen)

The rate of drying of fish muscle during the constant-rate period is controlled solely by the conditions of the ambient atmosphere and is equal to that from a saturated surface of the same shape. The duration of the constant-rate period is related to the rate of evaporation per unit area by an expression involving the effective diffusion constant, the thickness of the sample and the free water concentration as parameters.

Drying during the falling-rate period takes place in two distinct phases, in each of which the behaviour is in accord with a solution of the diffusion equation based on Fick's Law. In each phase, drying is characterised by an effective diffusion coefficient which is independent of shrinkage of the muscle and which in the first phase is considerably greater than in the second phase. Both coefficients vary with temperature according to an Arrhenius type of equation in which the energy of activation for diffusion is one of the parameters. The transition from the first to the second phase appears to be associated with the uncovering of the unimolecular layer of water which covers the protein molecules. Experimental evidence suggests that the processes of evaporation and diffusion may be characterised by a scheme of energy levels involving the heat of adsorption of the unimolecular layer, the heat of liquefaction of water and the energies of activation corresponding to each of the two phases of the falling-rate period.

All species of non-fatty fish exhibit identical drying behaviour during both the constant-rate and the falling-rate periods.

WATER-VAPOUR TRANSFER IN THE IN-PACKAGE DESICCATION OF DEHYDRATED FOODS

By C. E. Hendel, R. R. Legault, W. F. Talburt, H. K. Burr (Agricultural Research Service, U.S. Dept. of Agriculture, Albany, California) and C. R. Wilke (University of California)

An equation for estimating the rate of in-package desiccation and for studying the effects of the individual package components on the rate of desiccation has been developed. Estimated and observed drying-time values are in reasonable agreement, indicating that the method can serve as a guide for design of in-package desiccation systems, particularly in determining the relative effect of the various package components.

Transfer coefficients needed for use in this equation have been determined for materials representative of each of the package components and are given.

Estimated and observed drying-time values show that there is a pronounced decrease in rate of desiccation with increase in transfer distance through the product atmosphere, observed drying-time values ranging from three to seven times as long in containers of 30 cm. depth as in those of 7·5 cm. depth.

The estimates show that the package atmosphere offers a substantial resistance to water vapour transfer in containers 15 cm. in depth. Neither the desiccant nor the desiccant container (canvas) offered a large resistance under the conditions of these experiments. The resistance of the product varied markedly with the type of product and with its moisture content. For white potato, this resistance was small over the entire moisture range considered, for cabbage it was low at the beginning of desiccation but became very high at the end of desiccation, and for carrot ($\frac{3}{8} \times \frac{3}{8} \times \frac{3}{16}$-in.), the resistance was high even at the beginning of desiccation.

PHYSICAL PHENOMENA DURING THE DRYING OF FOODSTUFFS

By P. Görling (Institut für Lebensmittel-technologie und Verpackung, München)

To improve the quality of dehydrated foodstuffs, it is essential to have a detailed knowledge of the basic physical phenomena occurring during the drying process. The laws of heat and moisture movement governing the primary processes are already well known. By their aid it is possible to determine physical properties characteristic of the drying behaviour of the foodstuffs. The drying of potato slices serves as an illustration.

Although the rather complex interaction of many elementary processes and the serious dependence of the physical properties on the moisture content do not permit an accurate computation of the drying rate curve, the progress of the drying process may be predicted for all important points if the following data are known:

(1) Sorption isotherms; (2) break curves; (3) effective pore diameter; (4) diffusion-resistance factor; (5) heat conductivity.

If these data are available, useful recommendations for the proper control of the dehydration process may be given which also enable the prevention of undesirable secondary effects leading to deterioration of the product. With-

out a satisfactory insight into these secondary effects it is impossible to find a drying procedure which is time-saving and does not reduce the quality of the product.

The principles developed herein were applied to the drying of macaroni dough. An analysis of the shrinkage stresses and the determination of physical properties connected with the occurrence of such stresses made it possible to develop a procedure for the calculation of tensile stresses in the surface of the product which may mar the product by cracking or crazing either during or after drying. Using this method, a marked improvement of the procedure for the drying of macaroni was obtained.

SOME PHYSICAL DATA CONCERNING THE DRYING OF VEGETABLES

By A. J. Ede (Mechanical Engineering Research Laboratory, D.S.I.R., Glasgow)

Information on the rate of evaporation obtainable from the commodity to be dried and on the effect upon it of various conditions of air-speed, temperature, etc., is required when a drying plant is being designed. Knowledge of the technique of calculating rates of evaporation from surfaces which are truly "wet" is necessary. There is a close analogy between the rate of evaporation and heat transfer, the difference between the vapour pressure of water at the evaporating surface and that in the air stream corresponding to the difference between the temperature at the heated surface and that in the air stream. A further simplification may be possible; since in ordinary air-drying the latent heat of evaporation is supplied by the same air which carries away the evaporated water, it is unnecessary to consider in detail the conditions at the surface of the material being dried, as they are determined by the quality of the air. The rate of drying of a "wet" surface under such circumstances is approximately proportional to the difference between the dry- and wet-bulb temperatures of the air. It is possible, therefore, to use a drying coefficient, analogous to a heat transfer coefficient, based on the rate of evaporation divided by the wet-bulb depression of the air.

The drying of solid material involves the passage of water from within the material to the surface either as a vapour or as liquid. In some cases this can proceed fast enough to impose no serious limitation on the rate of evaporation from the surface, which remains effectively "wet." In other cases the rate of flow of water to the surface is restricted and the rate of drying depends not only on the condition of the air but on the state of the material. This so complicates the problem that recourse must usually be had to direct experiment with the material under consideration.

The results of a series of tests on the drying of potato, devised to obtain design data of the type referred to, were given.

THE EFFECT OF DRYING AND STORAGE IN THE DRIED STATE ON SOME PROPERTIES OF THE PROTEINS OF FOOD

By J. J. Connell (Torry Research Station, Aberdeen)

Although the proteins of food are known mostly on account of their nutritional significance, they probably have an equal importance in imparting characteristic physical properties to many foods. Impairment of these desirable properties and consequent reduction in food quality can often be attributed to alterations in the proteins of the commodity. In fact, the problem of retaining acceptable eating quality in proteinaceous foods, particularly as regards texture, is very largely the problem of ensuring the stability of particular proteins. Food-drying processes are certainly capable of impairing quality through their effects on proteins. Drying usually involves the application of heat, and proteins are among the most heat-labile of substances. The most obvious difference between a reconstituted dried product and its fresh counterpart lies in the difference in texture, which are probably attributable to alterations of protein. Most dehydrated meat and fish products taste drier and tougher after reconstitution than the undried materials.

The reactions underlying textural deterioration in foods are obscure. It is possible that the chemical changes are too small to be measured by the present methods. It has been pointed out, for example, that the cross-linking introduced by as little as 0·003% of divinylbenzene converts polystyrene from a soluble into an insoluble gel-like product. Such minute amounts of cross-linking would be very difficult to detect chemically.

In many protein foods the empirical relationship between rate of textural deterioration and temperature or moisture content remain to be determined. Other storage factors may be important, for example, ionic environment, *p*H, and oxygen content. Calcium is said to have a marked effect on the water-binding capacity and gelling power of meat and on the plasticity of muscle fibres; it too may have a role in deterioration during drying and storage. The interesting fact that toughening during storage is less with precooked than with raw dehydrated beef may also hold some clue.

SOME MATHEMATICAL DIFFUSION STUDIES RELEVANT TO DEHYDRATION

By J. Crank (Brunel College of Technology, Acton)

It is convenient to divide foodstuffs into two main classes for the study of diffusion: those which can be considered as homogeneous swollen gels in which moisture moves to the surface during drying by a single diffusion process and those which are permeated by a system of permanent interconnecting pores or capillaries. Foodstuffs of the second kind are essentially two-phase systems in which transfer of moisture may occur in a number of ways. Some of the relevant mathematical work on diffusion in both classes of substances was reviewed.

Abstracts of other papers read at the conference will appear in our next issue.

New Food College at Weybridge

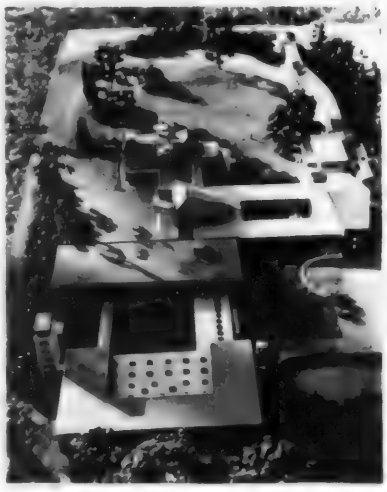
THE National College of Food Technology is building extensive new premises at Weybridge, Surrey.

Since it began work in 1952, the College has trained more than 100 students as food technologists and another 60 are in course of training. Industry has accepted these students gladly and has asked for more. But sufficient men and women of the right calibre capable of meeting the challenge, both national and international, of the future cannot be produced unless the present teaching facilities are greatly improved and extended.

Consequently, the Governors of the College have planned a new residential College capable of accommodating nearly three times as many students as at present. The project has the approval of the Ministry of Education, and building has now started on a beautiful site at Weybridge.

The National College of Food Technology came into being in 1951. It was established jointly by the Ministry of Education and representatives of the food industry and is governed by an independent Board of Governors drawn from all sections of the industry. Its purpose is to provide advanced courses for the education of food scientists and food technologists.

The present courses include 1-year Postgraduate studies in General Food Technology, Food Quality Control and Food Microbiology for science graduates, a 4-year Associateship Sandwich Course and a 2-year full-time Diploma Course, both in General Food Technology. The courses are all designed for students sponsored by the industry, although a number of suitably qualified University graduates and school-leavers are accepted each year so as to provide new blood for the industry. The 4-year Associateship Sandwich Course is intended to be of honours degree level and to produce food technologists of high calibre for posts in production, research, quality control and, ultimately, in senior management. The students attending it spend 6 months in College and 6 months in industry each year. Several leading food manufacturing companies are already participating in a scheme to provide the necessary industrial training each year. The College studies include basic science, food processing, food engineering, quality control and management. The 2-year Diploma Course offers similar training but at a different level and may be more suitable for those who wish to gain a qualification in a shorter time.



A model of the proposed new College of Food Technology at Weybridge.

The management studies are an important feature of the courses and are conducted by visiting lecturers with management experience in the industry.

Because the courses are widely based in food science and technology, students passing through them successfully are fit to enter any section of the food industry and can rapidly specialise thereafter.

In giving its approval for the new buildings, the Ministry has put a ceiling of £300,000 on its own contribution to the total cost and the remainder of the total cost is the responsibility of the food industry. The Ministry considers that the provision of special educational facilities for any industry should be a co-operative effort between that industry and the Government. This implies both the sponsoring of students and direct financial contribution towards the cost of buildings, equipment and other facilities necessary to ensure that the student receives the best possible training while being kept in close touch with industry. The Governors support this policy. Indeed, they believe that these facilities are essential if the food industry and its allied trades are to survive, and they draw particular attention to the fact that certain other countries are forging ahead in the field of food education.

There is a large house on the Weybridge site and this is being converted into a hostel for 20 students on the upper floors and into a library on the ground floor.

Attached to the house is the administration block of the College which is a single storey building surrounding a courtyard. Staff rooms and offices form the main part and there is a lecture theatre with steeply tiered seating and provision for projectors, a demonstration kitchen, tasting booth and preparation room for experiments in the lecture theatre, the whole of which is heated and air conditioned.

The two storey chemical laboratories connect by way of a corridor containing constant temperature rooms and plant rooms with the administration block and food processing block. The laboratories are equipped with research rooms, lecture rooms, staff rooms and complete facilities for both students and staff.

The Process Block is a single storey building, 16 ft. high, which will contain all the food processing equipment. It has special chemical resistant tiled flooring and tiled walls with all the services running around its perimeter to allow a completely flexible arrangement for connecting up the

(Concluded opposite)

Advances in Food Technology

BAKERY PRODUCTS

Freezing and Cold Storage

After baking, all bakery products are subject to more or less pronounced staling phenomena which are reflected in changes of taste, compactness, etc. These phenomena are mainly due to changes in the moisture content, and can be largely avoided by freezing and cold storage, which has the effect of stabilising the moisture distribution and delaying moisture loss. For the process to be successful, the bakery products should be chilled to −7°C. within a comparatively short time of baking (1-1½ hr. for pastry, 3-4 hr. for bread and cake), and should subsequently be deep-frozen to −18°C. A further shortening of the time elapsing before chilling and freezing has no noticeable effect on quality. Defrosting may take place in the oven, in conditioned warm air, or at ambient temperature. — W. Neumann, *Kältetechnik*, 1958, **10**, 57.

FREEZING

White Rings in Bread

Studies have been carried out at the Western Regional Research Laboratory of the U.S. Department of Agriculture, Albany 10, California, into a whitened or opaque ring ⅛ to ¼ in. in width which develops in frozen bread during storage. It was found that the length of storage before the initial occurrence and the subsequent rate of inward penetration were dependent upon the temperature of storage. At 15°F. the rings would appear 2 weeks after the bread was placed in storage, but at 10°F. 5 weeks were required, and at 0°F. 10 or more weeks were necessary.

The whitening was found to be associated with a movement of moisture by sublimation and diffusion from the interior of the crumb to a region of lower moisture content just below the crust. The effect could be produced by lyophilisation of frozen crumb when its moisture content is less than 37%.

The condition appeared to make no difference to the X-ray diffraction patterns compared with similar normal crumb. Microscopic examination of the frozen crumb revealed voids or pockets associated with the starch granules in the affected regions. The white appearance was attributed to the increased surface area caused by the voids.

It was found that a recovery of a normal appearance could be made by moistening the crumb and allowing it to dry.—J. W. Pence, N. N. Standridge, D. R. Black and F. T. Jones, *Cereal Chem.*, 1958, **35** (1), 15.

German Research Report

The German Federal Research Institute for Food Preservation, Karlsruhe, has carried out systematic experimental research on the influence of freezing and storage conditions in German locker plants on the quality of foodstuffs, including pork, vegetables (cauliflower, beans, peas, cucumber, tomatoes) and fruits (strawberries, raspberries, red currants, peaches).

The quality testing included subjective evaluation as well as physical and chemical tests. It was found that most products may be frozen in stagnant air at −18°C. and stored in small units of approx. 1 kg. weight, without any marked loss in quality, for periods varying between five months (pork, cucumber) and twelve months (peas). The experiments indicated that the best way to preserve the quality of pork is to freeze it in an air stream or in contact with cold plates.—J. Gutschmidt, *Kältetechnik*, 1958, **10**, 38.

MEAT PRODUCTS

Free Amino Acids

In connection with studies on the chemistry of meat curing, research workers at the German Federal Meat Research Institute at Kulmbach have investigated the distribution of nitrogen and amino-acids in raw and cured meat. The amino-acids were analysed paper-chromatographically. In investigations on the influence of brine curing on small pieces of meat, no significant difference was found between the free amino-acids contents of raw meat and those of cured meat. This is believed to be due to the fact that the loss of amino-acids dissolved by the brine is continuously made good by decomposition processes. The concentration of free amino-acids in the same meat product is lowest during the curing process just before maturing, the concentration being higher both in the raw meat and in the finished product.—R. Grau, A. Böhm, *Die Fleischwirtschaft*, 1958, **10**, 70.

New Food College

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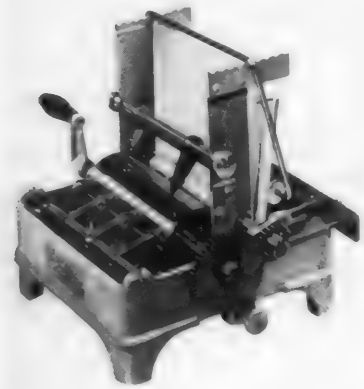
various processing units. The core of this building has rooms for storage, engineering workshops, testing laboratories and other ancillary rooms.

The majority of the students attending the College are to be housed in a new three storey hostel containing 60 individual study-bedrooms. Adjoining the hostel are dining rooms and kitchens with common rooms above opening out on to a roof terrace.

The Governors of the College will soon be appealing to the food industry to give financial support so that the new College, now in course of erection, can be completed in one operation and in a manner worthy of the industry it serves.

Machinery and Equipment



The Oyster Imp No. 1 hand-operated label gumming machine made by Leon Davis and Co.

LABEL GUMMING MACHINES

A range of label gumming machines of Dutch manufacture has been introduced by Leon Davis and Co. The machines are designed for the rapid gumming of hand-applied labels, and are claimed to speed up hand-labelling operations very considerably as well as eliminating nearly all wastage of labels and gum.

The *Oyster Imp* No. 1, which is hand-operated and deals with labels up to 6 in. sq., is the basis of this range. Special attachments can be provided for the dispensing of shaped and very long labels. Various types of glue may be used without modification, the amount applied being adjusted by means of 2 thumb screws. Feed and delivery of labels is constant and even, the delivery mechanism being well placed for easy take-off. The machine may be dismantled in 2-3 min. for cleaning, re-assembly being carried out in the same time.

The *Oyster Imp* No. 2 is similar to the No. 1 but is electrically operated. Alteration of speed can be obtained by the substitution of gears to suit requirements, the motor being moved on slides to compensate for smaller or larger gear wheels.

The *Oyster Imp* No. 3 is also electrically operated. This model has a variable resistance incorporated which enables the motor speed to be varied at will.

Both electric models have push-button control mounted on the base board, and require 5 amp. 3 pin power supply.

AIR BLOWERS

A 12 in. machine has recently been added to the range of *Holmes-Connersville Type RB* positive air blowers made by W. C. Holmes and Co., Ltd. The 10 in. machine made by the firm has been brought into line with the new 12 in. machine which has the redesigned "H" type of casing.

It is stated that the machines are of simple design having no moving vanes, valves, springs, or other small moving parts to work loose, wear out or become noisy. The impellers, which rotate in opposite directions, require a clearance of only a few thousandths of an in. from the casing, and this eliminates the need for a sealing liquid for normal rated service.

The revolving movement of the impellers draws air into the space between them and the casing, where it is trapped as the tip of the impeller passes the edge of the inlet opening. The opposite tip of the impeller passes the edge of the outlet opening and the trapped air is pushed through the outlet to the air line. The system is stated to make it easy to select the correct r.p.m. to move a given volume of air.

No sealing liquid is needed for the Holmes-Connersville Type RB positive air blower. Air is trapped by rotating impellers.

DIAPHRAGM VALVES

A comprehensive range of diaphragm control valves, complementing their established range of miniature and conventional pneumatic controllers is being made by Honeywell-Brown, Ltd. Included in the range are:

Single-seated valves give throttling action with tight shut-off. A choice of plug types provides equal percentage, linear or quick-opening action. Sizes range from 1 in. to 8 in.

Double-seated valves, for pressure-balanced throttling action on processes where fluid pressure is high, offer the same range of plug types, with the addition that equal percentage plugs can be either V-ported or contoured. Sizes from 1 in. to 8 in.

The Colt Ventilated Rooflights provide extra lighting and general ventilation.

Low flow valves, available in body sizes from ½ in. to 1 in. Reduced port sizes ranging from ⅛ in. to ¾ in. give flow coefficients suitable for low flow control, both in the laboratory and on the process. Plug action is equal percentage.

Three-way valves, single- and double-seated, can be piped for mixing or diverting service. The design is claimed to ensure that flow always tends to open the plug, giving increased stability and eliminating slamming. Body sizes range from ½ in. to 8 in.

All control valves are available in cast iron, cast steel or stainless steel. Cast iron valves are supplied with bronze trim: cast steel or stainless steel types normally have hardened steel trim, but stellited or Monel trim can also be furnished.

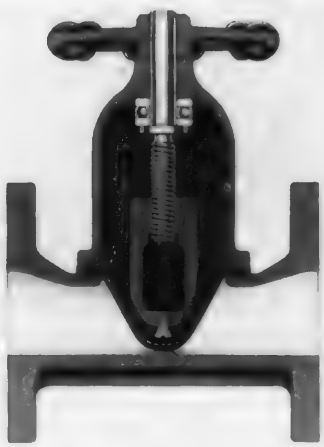
VENTILATION EQUIPMENT

Colt Ventilation, Ltd., have added circular and rectangular *Ventilated Rooflights* to their range of equipment.

These extractors are available in various sizes, with or without control dampers, to provide extra roof light and general ventilation for sedentary workers in departments where there is little or no heat from processing to be dealt with. The glass dome tops are available in a number of different glass finishes.

As an accessary to their list, the firm have added a fire indicator device for use with their dual purpose fire vents. The heat from a fire causing a vent to open sets off either a gong or a direct telephone line warning to the local fire brigade.

The Pyr-O-Vane millivoltmeter controller, giving accurate indication and a variety of control forms for temperature, etc.



This straight-through type valve, made by the Saunders Valve Co., Ltd., may be rodded through to remove deposits.

The ALM labelling machine made by R. W. Barraclough, Ltd., is fitted with an indexing feed conveyor.

MILLIVOLTMETER CONTROLLERS

Honeywell-Brown, Ltd., have announced two new types of indicating millivoltmeter controllers the *Pyr-O-Vane* and the *Protect-O-Vane*. An inexpensive addition to their line of products, millivoltmeters make automation available to simpler processes, and are suitable for secondary policing and alarm functions on big installations.

They are stated to provide between them a wide choice of control forms for temperature, etc. Accuracy on all models is ± ¾% of scale span, with dual compensation for ambient conditions. The high-resistance circuit makes accuracy independent of long leads, giving versatility of mounting location.

Control forms available on the *Pyr-O-Vane* controller include on-off, 2- and 3-zone, and time-proportioning action. Neutral zones for 3-position control are adjustable. The *Protect-O-Vane* model has been developed to shut process down or give an alarm signal when temperature exceeds the set-point.

Sensitive vane-type control on all models is said to give reliable snap-action at set-point.

Plug-in design of measuring and control units facilitates inspection, maintenance and change-over of range and control action. A universal-mounting case houses both measuring and control units in separate compartments.

Fail safe action includes automatic shut-down on power or component failure. Thermocouple burn-out protection is an optional feature.

DRY AIR FILTER

The Visco Engineering Co., Ltd., has introduced a dry air filter, type *M.V.*, which has been developed from their type *C.E.* filter.

The new air filter comprises a frame and a removable cell. The cell consists of 2 sections which fit together to hold the filter pad firmly between them. The over-all size of the filter is 20 in. sq., the same size as the vertical panel, oil-wetted air filter made by the same firm. This allows 2-stage filtration to be carried out with the 2 filters fitted into the same housing.

It is claimed that the filter operates at an efficiency of 99·9% on a weight basis handling air of normal atmospheric dust content. The capacity of the filter is 750 c.f.m. with initial resistance of 0·125 in. W.G.

BOTTLE SCREEN PRINTING MACHINE

The new *SPS Rotascreen* bottle screen printing machine has been demonstrated for the first time by the British agents, Gordon and Gotch, Ltd.

The machine is fully automatic, and is designed to screen print a wide range of cylindrical shaped containers including gloss and polyethylene bottles, jars, pots or tins. It can be used for containers varying in diameter from ¾ in. to 3 in. and in length from 3½ in. to 11¾in.

A servo-motor provides automatic centring and automatic feed is incorporated by star feeder. Stencils can be retouched without affecting the register.

An additional hand feeding attachment allows flexible containers to be printed on the machine. This unit is stated to give feeding, printing, and delivery without intermission. The machine works from a 220 v. single phase motor using 90 watts. The space required is only 24 in. × 16 in. overall plus conveyor delivery arrangements provided by the consumer. Nett weight is approximately 180 lbs. Output is up to 2,500 impressions an hr.

The SPS *Rotascreen* is manufactured by Siebdruckgerate Von Holzschuher KG., of West Germany.

LABELLING MACHINES

Two new labelling machines have been introduced by R. W. Barraclough, Ltd., who state that both machines are moderately priced.

The first is a header labelling machine, type *AHL*, which can be used for heat-sealing header or saddle labels on all kinds of bags or packs. It can handle flat or gusset-type bags and can either be fitted into a packing line or arranged with automatic feeding devices to take the output from any type of automatic bag filling and closing machine.

It may be hand fed at a rate of up to 30 per min. or machine fed at up to 60 per min. It is powered by a ¼ h.p. motor, 400 volts, 3 phase, 50 cycles.

The label magazine is adjustable up to a label width of 6 in. A variation switch controls the temperature of the heating block.

The other machine is the *ALM* labelling machine which is basically semi-automatic, handling up to 30 articles per min., but which may be converted to an automatic machine by using an indexing feed conveyor, giving a speed of 60 articles per min. The use of the machine is not limited to flat labelling but it may be used for all-round labelling of bottles, fancy panelling or for 2 or 3 sided work. Labels are only fed when the product is in position.

STRAIGHT-THROUGH VALVE

A straight-through type diaphragm valve has been introduced by the Saunders Valve Co., Ltd., who say that the bore of the valve permits rodding through to remove accumulated deposits of viscous and similar fluids.

The valve is known as the KB and is available in sizes from ¼ in. to 10 in. diameter. Flanged models are available with rubber, lead or glass mounting.

News Digest

Confectionery Group meeting in Edinburgh

A meeting of the Cocoa and Chocolate and Sugar Confectionery Groups of the B.F.M.I.R.A. was held in Edinburgh on March 25, 1958. Dr. F. H. Banfield (Director of Research) and members of the research staff were present to discuss the work of the Research Association.

In the morning, Mr. E. H. Steiner opened a discussion on the progress of research on chocolate and referred to problems connected with measurement of viscosity and their practical significance, the crystallisation of cocoa butter and alternative fats in relation to fat bloom, control of particle size, and analytical methods for chocolate with reference to the requirements of international trade.

In the afternoon, Mr. P. R. Smith introduced a discussion by referring to the wide range of publications issued by the Association in the last 12 months; the subjects covered included the shelf-life of high boilings, the moisture relationships of moulding starch and the stoving of confectionery, agar jellies and problems connected with the use of egg albumen.

In conclusion, Dr. Banfield expressed the willingness of the Research Association to hold similar group meetings from time to time to suit the convenience of members in areas somewhat remote from London and who find it difficult to attend the regular panel meetings. The discussions which took place at both sessions and the interest shown indicated that this move would be welcomed by the Association's members.

Borough Polytechnic confectionery courses

The programme of the Department of Chemistry and Food Technology of the Borough Polytechnic for the session 1958-59 has recently been issued. It includes full-time courses leading to the Polytechnic Diploma and Higher Diploma in chocolate and sugar confectionery, in addition to part-time and special advanced courses. These are the only full-time courses in chocolate and sugar confectionery in the United Kingdom.

Full-time students attend 5 full days per week for 2 years. The new session begins on September 18, 1958.

The syllabus includes practical and theoretical instruction in processing, experimental work, science, raw materials, plant and equipment, and design and display.

Judging the quality of British grown pickled onions at the laboratories of the British Food Manufacturing Industries Association. ***Left to right are:*** **Mr. W. H. Brighton (Macks (Walsall) Ltd.); Mr. W. D. Silver (Ocean Preserving Co., Ltd.); Mr. J. C. Dakin (Research Chemist in charge of the Pickles and Sauces Section, B.F.M.I.R.A.); and Mr. M. H. Heisser (Brother Bung Products, Ltd.).**

Fish processing centre

The Herring Industry Board is to carry out a major development at Mallaig, Inverness, to provide a centre for fish processing and handling capable of dealing with some 10,000 cans per annum. The new premises will be equipped with quick freezing facilities to allow storage of bulk supplies at peak periods.

Glass container research

At a celebration of the 100th meeting of the Glass Container Research Committee, the chairman, Mr. W. J. Smith, said that the specifications issued by the committee resulted from considerable thought and experiment. Standardisation of specific types of glass containers was of benefit to packers and to manufacturers of closures and filling machinery, and one of the outstanding features of this work had been the close co-operation with user organisations. The preparation of a brochure giving details of each specification was well in hand and that he hoped that this would be widely distributed to those who favoured glass for packaging.

Home-grown pickling onions

Most of the onions pickled in this country during the autumn and winter months have hitherto been imported from Holland, but in March, 1957, a meeting took place between the Food Manufacturers' Federation, Inc., and the National Farmers' Union with a view to furthering the growing of pickling onions in this country. Trial plots of various varieties of onions were put down by the National Vegetable Research Station in different parts of the country. The best varieties from these trials were sent to the British Food Manufacturing Industries Research Association for pickling.

Members of the Association's Pickle and Sauces Panel, and others, have judged the onions for quality. Several varieties have shown promise and it is expected that some 400 tons of onions for pickling will be grown during the coming season on a trial basis.

André Mayer fellowships

The Food and Agriculture Organisation of the United Nations has announced that it will offer 8-10 André Mayer Fellowships in 1958.

These fellowships will be awarded only to persons with the highest qualifications for research work in agriculture, agricultural economics and statistics, fisheries, forestry and nutrition.

Further information can be obtained from the secretariat of the F.A.O. National Committee for the United Kingdom, c/o Ministry of Agriculture, Fisheries and Food, Whitehall Place (East Block), London, S.W.1.

Management Development Institute

The brochure and application form for the I.M.E.D.E. (Institut pour l'Etude des Méthodes de Direction de l'Enterprise) programme have now been published. This is the second year of this scheme for developing executive talent. The institute is a Nestlé Alimenta Foundation under the patronage of the University of Lausanne.

Revised tinplate prices

A new price schedule, approved by the Iron and Steel Board, has been issued by the Steel Company of Wales, Ltd. This schedule reduces the price of tinplate to large consumers.

The Metal Box Co., Ltd., propose to pass on the full advantage of the current reduction in tinplate prices to their customers.

Aluminium in packaging

The eighth symposium organised by the Aluminium Development Association will be held in London on June 12, 1958. The subject will be "Aluminium in Packaging" and discussion will be divided between morning and afternoon sessions.

The field to be covered is stated to be both varied and wide, with interest concentrated on non-returnable containers. Eight papers will be submitted for discussion.

Meat content of pies

West Suffolk county council has decided to take proceedings in all future cases where there are serious deficiencies in the meat content of meat pies and sausage rolls.

This follows a report by the county health committee giving details of samples of pies and rolls taken and analysed, which states that the public analyst considers that a meat pie which contains less than 20% meat and a sausage roll which contains less than 15% meat are not satisfactory.

Meeting on fishing costs and earnings

Sir A. Louis Chick, K.B.E., chairman of the U.K. White Fish Authority, will be chairman of an international meeting on "Costs and Earnings of Fishing Enterprises," which will be held in London from September 8 to 13, 1958.

Organised by the Food and Agriculture Organisation of the U.N., (FAO), the meeting will take place in London at the invitation of the British Government. The 77 Member Governments of FAO have been invited to send experts to it.

Record soft-drinks production

The output of the British soft drinks industry in 1957 was an all-time record according to the provisional figures for the last quarter of the year, issued by the National Association of Soft Drinks Manufacturers.

The total, 338,454,000 gal., was double the figure for 1947 and treble the figure for 1937. It was 40 million gal. more than the 1956 production.

The output of concentrated soft drinks was 22% higher than the 1956 total at 27,589,000 gal. The output of ordinary soft drinks passed 200 million gal. for the first time and was 8½% higher than the production in 1956.

Lumenated ceilings

The General Electric Co., Ltd., and Lumenated Ceilings, Ltd., have agreed to combine design and development resources to provide a nation-wide service for the marketing and application of lumenated ceilings.

OBITER DICTA

● Potatoes—pink, white, yellow, and mothball-flavoured—made news yesterday.—*Daily Mail.*

● Beer has done more for British bowels than all the products of the pharmaceutical industry.—*"Well-known physician" in Sunday Times.*

● What smells bad, with such notable exceptions as Limburger and Liederkranz, is seldom good.—*Dr. P. B. Sears, past-president, American Association for the Advancement of Science.*

● Mr. Snow: Port is a civilised and a civilising drink and although it is sometimes rather unfortunately qualified by lemon, it is traditionally a good working class drink.—*House of Commons Report.*

● Alpine climbers were flown 6,500 ft. up the Tasman Glacier in New Zealand's South Island to cut 3 blocks of ice for a dinner in New York. The ice was used to cool drinks at a Press dinner organised to publicise New Zealand foods.—*Evening News.*

● Mrs. Bowen, who lives opposite the well, said: "Even if I had a piped water supply, I would still use the water from the well. I have lived here for 25 years, and have raised 6 children." They all seem to have thrived on it. Mr. Bevan, of Glasfryn Villa, said that he had seen worms and insects coming out of the tap from the well.—*South Wales Voice.*

● Six mineral oils have been classified as "unsuitable for frying." Four were found to corrode equipment rapidly, one gave off toxic vapours that proved fatal to operatives not equipped with suitable masks, and one imparted an olive green colour to all organic material (including human tissue) with which it came into contact.

● Deep-frozen chips have shown a tendency towards mechanical failure during resuscitation. One consignment which was flown to New York and back in a chartered aircraft turned into a light blue powder material when "thawed out." The possibility that the powder may be of value as a thermal insulant for prefabricated buildings is being actively pursued.—*Annual Report, British Deep Fat Frying Research Association.*

Coffee futures market

A committee appointed by the Coffee Trade Federation has started preparing for the opening of a Coffee futures market in London. It is hoped to begin dealings in June, 1958.

If the market comes into being it will not be the first in London for an earlier one, which was based on a Brazilian contract, failed in the 1920's through lack of business. The proposed market would be based on an African Robusta contract. Africa supplies about one-fifth of the world's coffee. It is said to be impossible at the moment for the dealers to hedge against price fluctuations in the Robustas as the New York market only has contracts based on Colombians and Brazilians.

The broad framework of the market is believed to have been worked out already and there is said to be sufficient interest for the scheme to be put into operation.

The African side of the trade have opposed the scheme since it was first thought of 2 years ago. They feared that the market would take a slice of the business away from the auctions which are held in Nairobi and Mombasa. It was decided to go ahead with the scheme in spite of the opposition from that source.

Quick-frozen food firms meet

Negotiations have begun between Unilever and Vita N.V., the Dutch company which has been successfully engaged in the quick-frozen food industry on the Continent for many years. Vita has enjoyed a substantial export trade in many European countries including the United Kingdom as well as growing sales within Holland itself. The company owns factories at Utrecht, Rotterdam and Leiden. Unilever, through its associated Birds Eye companies, operates in the quick-frozen food field in the United Kingdom, New Zealand and Australia.

Film catalogue

A catalogue of their films "Films for Industry" has been issued by the British Productivity Council. Copies of these 16 mm. films, which emphasise the importance of mechanisation and work study, may either be hired or bought. The catalogue is available from the Central Film Library, Government Building, Bromyard Avenue, Acton, London, W.3. Net price: 2s.

Pressurised beer tanks

Ind, Coope and Allsopp have developed pressurised tanks of 500 gal. capacity for supplying beer to the Isle of Man and other islands. It is believed that this method of transportation yields considerable savings compared with the use of barrels.

PEOPLE

MR. S. A. BERGEN, M.B.E., A.M.I.E.E., has been appointed chief development engineer of the Cambridge Instrument Co., Ltd.

■

MR. K. H. BLACKLOCK has been appointed a director of Eastern Counties Preserves (1940), Ltd., who have factories at Long Sutton, Lincs., and at Forfar and Carnoustie in Angus, Scotland.

■

MR. R. A. LE PAGE, M.A., has been appointed a director of Mancuna Engineering, Ltd. He was formerly southern area manager.

MR. N. S. STEADMAN assumes responsibility for the southern area office in Surbiton, Surrey.

■

MR. J. R. ALLAN has been appointed joint managing director of Acme Ventilating, Ltd. He is already a director of Acme Conveyors, Ltd., and holds the post of general manager of the Acme group of companies.

MR. P. LOWE has been appointed sales director of Acme Conveyors, Ltd.

■

MR. G. R. GEORGE, (James Cruikshank, Ltd.), and MR. J. PELKMAN (John Pelkman Engineering Co., Ltd.,) have been appointed chairman and vice-chairman respectively of the Bakery Equipment Manufacturers' Society. During their term of office they will represent the society on the council of the Food Machinery Association.

■

MR. C. B. WALKER has been appointed a director of Stoddart and Hansford, Ltd., manufacturers of cake mixes. He joined the company 2 years ago as sales manager. In his new appointment he will continue with his present duties which include responsibility for sales and advertising.

■

MR. BRIAN H. TURPIN, managing director of Q. V. F., Ltd., chemical engineers in glass, has been appointed managing director of Quickfit and Quartz, Ltd., makers of interchangeable laboratory glassware, of Stone, Staffordshire. Both companies are members of the Triplex group of companies.

Mr. Turpin succeeds SIR GRAHAM CUNNINGHAM, who continues as chairman. In his recent Interim Report of the Triplex Safety Glass Co., Ltd., Sir Graham intimated that he wished to be relieved of some of the more detailed calls on his time and to make way for younger men.

Mr. James D. Devey.

MR. JAMES D. DEVEY, B.SC., has been appointed customer service manager by Fredk. Boehm, Ltd. He will take charge of the experimental kitchen at their Belvedere, Kent, factory and will be at the disposal of food manufacturers in regard to the technical application of the firm's products. He was originally a member of the staff of the Food Research Laboratory of Unilever, Ltd., and later with Chivers, Ltd.

Before his appointment to Fredk. Boehm, Ltd., he was chief chemist to the Preserves Division of the Co-operative Wholesale Society.

■

MR. ERNEST KIRKBY, who has been manager of the Kidderminster factory of the British Sugar Corporation since the formation of that company in 1936, has retired. During that time he has been responsible for processing more than 5,500,000 tons of beet.

He was released from the Army before the end of the first World War for experimental work designed to prove that sugar beet could be grown commercially in Britain.

Mr. Kirkby worked with the Home Grown Sugar Co., Ltd., which built the country's first sugar factory in 1921 in Nottinghamshire. Four years later he went to the sugar factory in Kidderminster.

He saw the factory's capacity grow from 500 tons of beet a day to five times that amount with plant for refining sugar outside the beet season and packing 900 tons of sugar a week.

■

MR. GEORGE BOEX, a former managing director of the British Aluminium and Associated Companies, retires from the board by rotation on May 6, 1958. He does not wish to seek re-election, but will continue in a consultative capacity.

Mr. Douglas J. James.

MR. DOUGLAS J. JAMES, O.B.E., managing director of the Pearlite Box Co., Ltd., has been appointed chairman of the British Paper Box Federation (London and South Eastern Region). He was leader of the British Paper Box Federation Productivity Team which went to America in 1950 and is Hon. Secretary of the Executive Committee of the Anglo-Norse Society.

■

MR. F. G. BREWER, O.B.E., who has been secretary to the Gas Council since its formation in 1948, is to retire from that office at the end of September. The council has appointed as his successor the chief accountant of the council, MR. WILFRID BAILEY, F.S.A.A., F.I.M.T.A.

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70 years' service

On April 8, 1958, Mr. Edward Ives was entertained to luncheon by the directors of W. J. Bush and Co., Ltd., and Potter and Moore, Ltd., to receive a presentation in honour of his remarkable achievement in completing 70 years of unbroken service with the Bush Group of Companies.

"Teddy," by which name he has always been affectionately known, entered the service of W. J. Bush at 26/30, Artillery Lane, which was then the headquarters of the company on April 8, 1888. He later served the company at their new headquarters at Ash Grove, Hackney, where he remained until his transfer to the Associated company of Potter and Moore, Ltd., in 1929 as expedition manager.

Now, in his 84th year, he is still able to undertake appropriate duties. His many friends wish him continued health and happiness.

Erections and Extensions

Pure Lemon Juice Co., Ltd., are planning to build a factory at Newhaven, Sussex.

▪

Earnshaw Brothers, Ltd., bakers, are having extensions erected at their bakery in Cooper Street, Sunderland.

▪

Callard and Bowser, Ltd., manufacturing confectioners, are planning to build extensions to their Silverdale Works, Hayes, Middx.

▪

R. S. McColl, Ltd., manufacturing confectioners, are having a single-storey extension built at their factory in North Woodside Road, Glasgow.

▪

Riverside Milling Co., Ltd., flour millers, are having additional mill buildings erected at Shearer Street and Shearer Lane, Glasgow, C.5.

▪

Newmarket Co-operative Society, Ltd., have purchased a site near All Saints' Church, Newmarket, for the construction of a food warehouse and distribution depot.

▪

T. Mason and Sons, Ltd., mineral water manufacturers, have plans in hand to build extensions to their factory at Grantham Road, Smethwick, Birmingham, at a cost of £17,500.

▪

Tudor Products, Ltd., Sandyford Road, Newcastle-on-Tyne, have had plans approved to build a potato crisps factory, covering a total floor area of 75,000 sq. ft., at Willington Square, Wallsend-on-Tyne.

▪

Stokes and Dalton, Ltd., spice millers, Smithfield House, Charterhouse Street, London, E.C.1, have had plans drawn up for the proposed erection of showroom and office premises at 85, Charterhouse Street, at an estimated cost of £15,000.

▪

Robinson's Rolls, formerly of 149, Paisley Road West, Glasgow, have taken over the former Smith's (Glasgow), Ltd., bakery at 292, St. Vincent Street, Glasgow, and are concentrating this unit on the production of morning rolls. The plant has been reconstructed, with the dough room on the first floor handling mechanically to the bakehouse on the ground floor, where dispatch is also located. Morning rolls are the firm's main produce.

FORTHCOMING EVENTS

Society of Chemical Industry

Food Group

May 14. A.G.M. Address by Sir Harry Jephcott, chairman of the Research Council of the D.S.I.R. At 6.15. Address: 14, Belgrave Square, London, S.W.1.

Microbiology Group

May 8 *and* 14. Visit to Pfizer, Ltd., Folkestone.

Royal Institute of Chemistry

May 9. Thames Valley Section. Symposium on Radiation Chemistry of Organic Systems. By Dr. W. Wilde, Dr. R. Roberts, Dr. D. S. P. Roebuck, Dr. W. H. Stafford, and Prof. J. Weiss. At 11 a.m. Address: Cockroft Hall, Harwell.

Incorporated Plant Engineers

May 6. Engineering problems in the beet sugar industry. Mr. K. Hample. At 7.30 p.m. Address: White Lion Hotel, Church Street, Peterborough.

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Company Profits and Prospects

Cow and Gate increase profit

The annual report of the chairman of the Cow and Gate Group shows that they made a net profit for the year ending September 30, 1957, of £1,567,525 (£1,396,006), including various credits relating to previous years. After making allowances for taxation the total profit came to £1,025,356 (£704,293).

A dividend of 20%, less tax, was approved.

▪

Negretti and Zambra treble turnover

The annual report for the year ending September 30, 1957, of the instrument makers, Negretti and Zambra, Ltd., shows in a graph that the firm has more than trebled its turnover in the past 10 years.

The profit of the firm amounted to £141,838 after making allowances for taxation and depreciation. A final dividend of 11%, less tax, was approved.

▪

Glaxo boost turnover

Provisional figures for the half year up to December 31, 1957, reveal that the Glaxo Group turnover increased by 24% on the corresponding period of the previous financial year, and by 5% as compared to the 6 months ending June 30, 1957. The trading profit amounted to £2,509,000, against £1,601,000 for the corresponding period of 1956. The report is not optimistic about further improvement during the current half year. An interim dividend of 6¼% was declared.

Technical Press Review

May

World Crops.—Horticulture: Commercial Tomato Growing in the West Indies; Horticulture in the Himalayas; Seed Dressings; The Citrus Industry in Cyprus.

Manufacturing Chemist.—Mixing Plant and Equipment: Mixing and Blending; How Work Study Helps in the Design of Chemical Plant; Non-Ionic Surface-Active Agents; Germicides Based on Surface-Active Agents; Progress Reports; Disinfectants and Disinfection; Cosmetics and Toilet Preparations.

Dairy Engineering.—New Cleaning Technique for Centrifugal Plant; Electricity in the Dairy: Electrical Equipment for Dairies; Power Requirements in German Dairies; Production and Performance of Paraflow Pasteurising Plants; Current Progress in Cartoned Milk; Cheese making in Czechoslovakia.

Chemical and Process Engineering.—Oils and Fats Processing; Estimation of Gaseous Densities; Costs of Mild Steel Drums; How Granules are Formed; Preview of Achema Exhibition.

Automation Progress.—Automatic Handling and Treatment in Mining; A Driverless Truck for Works Transport; Fault Location and Control for Conveyor Systems; Reading Machines; Reducing the Queue; Mechanical Speed Variator in Automatic Clutch Systems; Electromagnetic Brakes and Clutches in Recent Automatic Plant.

Atomics.—Economics of Nuclear Ships; Ship Propulsion by Nuclear Power—1; OMR and Ship Propulsion; C.C.G.C. Reactor for Ships; Tankers Under the Sea; Neutron Induced Nuclear Reactions.

Paint Manufacture.—Achema Exhibition at Frankfurt; Polyesters; Coatings of the Future; Paint in Other Languages; The Rose, Downs and Thompson Heating System.

Petroleum.—Export Preview of the Petroleum and Chemical Engineering Exhibition; Kent Refinery Expansion; Hydraulic Tankers; Processing Egyptian Belayim Crude Oil.

Public Works and Muck Shifter.—Special Issue on Engines for Civil Engineering and Plant; Power and Irrigation Works in Ceylon; Glen Canyon Dam Under Construction.

Building Materials.—Recent Developments in the Design, Construction, and Installation of Lifts for Offices, Flats, etc.

Food News Overseas

South African sugar production

The 1957-58 season has established a new production record for South African sugar. By the end of the crushing season early in March, it was estimated that about 960,000 tons of sugar would have been manufactured in 18 mills. The overall milling efficiency in the industry has improved over previous years, resulting in the highest sucrose extraction since 1947. Exact figures up to the end of January show that 947,286 tons of sugar has been produced from 8,481,175 tons of cane.

Sugar exports from the Union during 1957 amounted to 162,500 long tons of which 114,500 tons went to the United Kingdom. The Rhodesian Federation took the balance of 48,000 tons.

The annual quota of 80,000 tons of sugar granted to the Swaziland Protectorate by the Union Government is being shared by two firms—Ubombo Ranches, Ltd., and the Mhlume Sugar Milling Co., Ltd. The latter company has been formed by the Colonial Development Corporation and Sir J. L. Hulett and Sons, Ltd.

The first sugar mill in Swaziland is expected to be in operation by June at Big Bend on the Great Usutu River. It will have a capacity of 20 tons of sugar cane per hr. and it is expected that about 15,000 tons of sugar will be manufactured during the first season. A larger mill capable of handling 60 tons of cane hourly will be completed by 1960.

The sugar cane is grown under irrigation and the yield of sugar at Big Bend is expected to be about 50-55 tons of cane per acre a year. Conditions are similar to that of the successful Pongola River scheme in the nearby Eastern Transvaal Lowveld where 350,000 tons of cane giving 45,000 tons of sugar have been produced in the current season.

Australian packaging firm

Transparent Paper, Ltd., have announced the formation of a new selling company in Australia.

This new company, Transparent Paper (Australia), Pty., Ltd., is already in operation, and has its offices at 386, Harris Street, Ultimo, Sydney.

Mr. Reginald F. Shimell, until recently export manager of the parent company, will be a director as well as manager.

While the headquarters of the company are to be in Sydney, an office will also be opened in Melbourne. Mr. J. Preece, until recently with the company on the technical side, will be in charge of this branch office.

Armour Star tomato juice is made from crops grown in Victoria and New South Wales, Australia.

Israeli canning factory

An agreement for the establishment of a fruit and vegetable canning factory in the Arab village of Baka-el-Gharbiya has been initialled by the Minister of Commerce and Industry, by a member of the Israel Parliament, Mr. Fares Hamdan, an Arab heading a group of investors, and the Akka-Adir Canning Co. Approximately I£600,000 will be invested in the enterprise of which I£400,000 is to come as a Development Budget loan. The factory will employ some 120 workers, mostly Arabs, and production will be mainly for export.

Dominican banana processing

The Granada Co. of the Dominican Republic has announced that more workers have been engaged for an expansion in its banana processing plant. By canning the bananas in the form of purée the company as well as saving shipping space reduces handling problems in transit. The purée is in great demand in the U.S. where it is used in the manufacture of baby food, ice-cream and confectionery. This year's production is estimated at 500,000 cans, holding 1¼ gal. each.

Refining plant for Africa

Dr. Alan J. Hayter of Sharples Centrifuges, Ltd., has just returned from a visit to Portuguese East Africa. The visit was made in collaboration with S. E. Ginwala Filhos, Lda., a local refiner, with the object of determining how the efficiency of cottonseed refining could be increased. Ginwala are now proceeding with the installation of a Sharples *Low-Loss* refining plant, and when the plant begins operation later this year Sharples say that it will be the most advanced and efficient refining plant in Africa.

Australian tomato juice

A choice grade of Australian tomato juice has recently been introduced to the British market under the trade name *Armour Star*. It is made from crops grown in the fertile Goulburn Valley area of Victoria and New South Wales, hand-picked in the November-December period, when the fruit is at its best, and processed to Armour's specifications by one of the foremost Australian canning concerns, the Raleigh Preserving Co., of Brunswick, Victoria.

The juice is canned in 15 oz. and 28 oz. tins, carrying attractive labels showing the produce in its natural colours, and is available through all wholesale grocers.

Sales promotion backed by a large-scale, nation-wide advertising campaign run by the Australian Trade Publicity authorities under the slogan "Australia sends her best to Britain," should be of considerable assistance to the trade, as it ties in naturally with this new product.

Tanganyika sugar plan

The Tanganyika Government has granted an exclusive licence to the Tanganyika Sugar Co., Ltd., to investigate the suitability of certain parts of the Kilombero Valley for sugar production on a fairly large scale. The company has announced its intention of opening up the land and gaining experience before starting tenant farmer schemes to encourage Africans to grow sugar in the area. It is expected that the first crop will be ready in 1960 with a probable yield of about 25,000 tons a year.

Negotiations between the company, at present a private one, the Tanganyika Government and Tiedeman and Van Kerchem of Amsterdam, have been going on for some time. The Dutch firm is to send a team of experts to visit the area in July to investigate the possibilities of sugar production in the Valley and also the growing of cocoa, tobacco, rubber and oil-palms.

Packaging

The vapour vacuum cap used by Trufood, Ltd., for their Spoonfoods, is made by Whitecap International, Ltd.

Vacuum closure for infant foods

The vapour-vacuum method for the packaging of foods in glass containers has been adopted by Trufood, Ltd., for their Spoonfoods range of infant strained foods. This method involves the closing of the containers in an atmosphere of dry steam with a specially designed *Pry-Off* cap, now being made in England by Whitecap International, Ltd. The steam displaces the air between the contents of the container and the cap, condensing when the jar cools to leave a vacuum in this head-space. A composition gasket within the cap ensures that a hermetic seal is produced and maintained throughout subsequent processing.

The cap is triple coated with cream lacquer to give protection to the product. The jar may be opened with a lever which is being distributed free by Trufood, or by the insertion of a coin or similar implement between the cap and the rim of the bottle. The cap can be replaced if the contents of the jar are not used at one time, and when pressed back by hand it gives a seal which provides adequate protection from air, dust, and foreign odours.

Truefood have taken advantage of this change in closures to introduce a re-designed jar. This is shallower and wider than its predecessor, and the shoulder is raised and emphasised to protect the skirt of the cap, thus preventing any risk of seal becoming damaged.

Skirted caps

As soon as the British Standard Specifications for R.3 and R.4 glass finishes for bottles and jars were issued, John Dale, Ltd., tooled up to supply plastic caps for these bottles and jars and for some time they have been supplying a complete range of both the R.3 shallow and R.4 deep series.

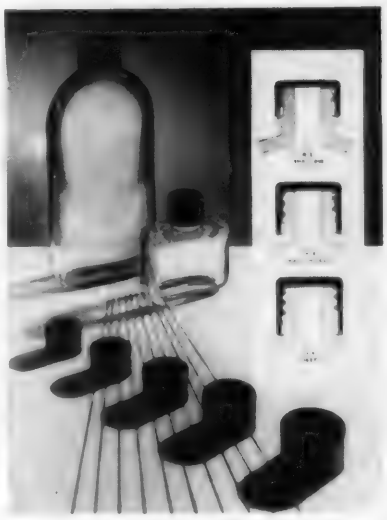
Through their subsidiary company in Canada they discovered a medium deep cap for which an American Specification existed. They are now offering a range of this medium deep-skirted cap which they believe will satisfy the increasing demand for such a closure in this country, and this will be known as the *Dale Medium Deep Cap*. This range of caps is being made in 18 mm., 20 mm., 24 mm., and 28 mm., and like the R.4 deep cap, is designed to screw down over the parison ring of the bottle and on to the shoulder, whereas the R.3 cap screws down to the parison ring but does not cover it.

The reduced depth of this new cap is stated to offer the same attractions as the deep R.4, while it is correspondingly cheaper.

Flavoured straws

New drinking straws with "built in" flavouring of strawberry or chocolate are now being distributed by Wilts United Dairies, Ltd.

The new straws, called *Carnival*, are made in Bermuda and contain a highly concentrated strawberry or chocolate solid flavouring at one end of the straws. When stirred in a glass of milk, the concentrate dissolves sufficiently to give the milk the appropriate colouring and when drawn through the straw, the concentrate flavours the milk.



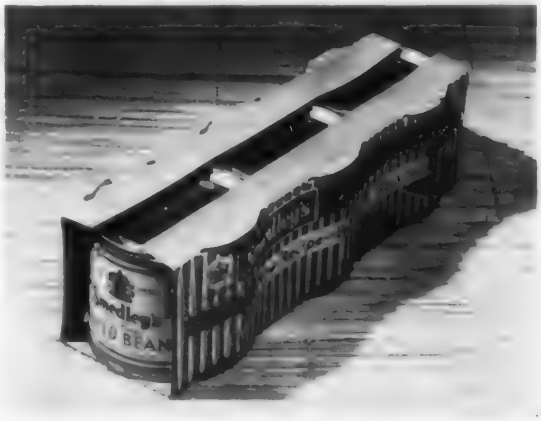
The Dale Medium Deep Cap screws on to the bottle shoulder.

Sleeve for carrying cans

The Metal Box Co., Ltd., have produced a sleeve to hold 2 or 3 cans or similar containers. It can be packed automatically at high speeds and needs no glue or staples.

Known as the *Carrypack*, the sleeve is made of stiff card cut in such a way that when folded it holds two or three units in a single, firm and easily handled pack. A selling message may be printed on all four outer sides. Should a promotion campaign call for the distribution of coupons, a coupon may be printed as part of the carrier.

The *Carrypack* can be made to take units varying in size from the 5 oz. processed food can to the 16 oz. beer can. It is being used by Smedley's for 3 cans of their baked beans in tomato sauce.



The Carrypack holds 3 cans together in a firm parcel. It is produced by the Metal Box Co., Ltd.

Coloured sausage wrappers

The new coloured wrappers for Harris's Wiltshire sausages distinguish between the two types by having the design printed in blue and white for pork sausages and in red and white for beef sausages. The wrappers were designed by Michael Goaman, M.S.I.A., and printed by British Sidac, Ltd., on QSAT film.

Stencil ink dispenser

An aerosol ink dispenser, now available after 2½ years of development, can be used for stencilling boxes, crates, cartons, bales, metal drums, tarpaulins, concrete, etc. The ink, called *Spray*, is quick-drying, waterproof, and suitable for porous or non-porous surfaces and cuts out the waste and mess so often associated with stencilling methods. It is said to be always ready for use, without any preparation beyond a shake of the can. Cleaning, and replacement of brushes and preparation of solid stencil ink are eliminated. No additional equipment is required.

The aerosol stencil ink is marketed by J. and H. Rosenheim and Co.

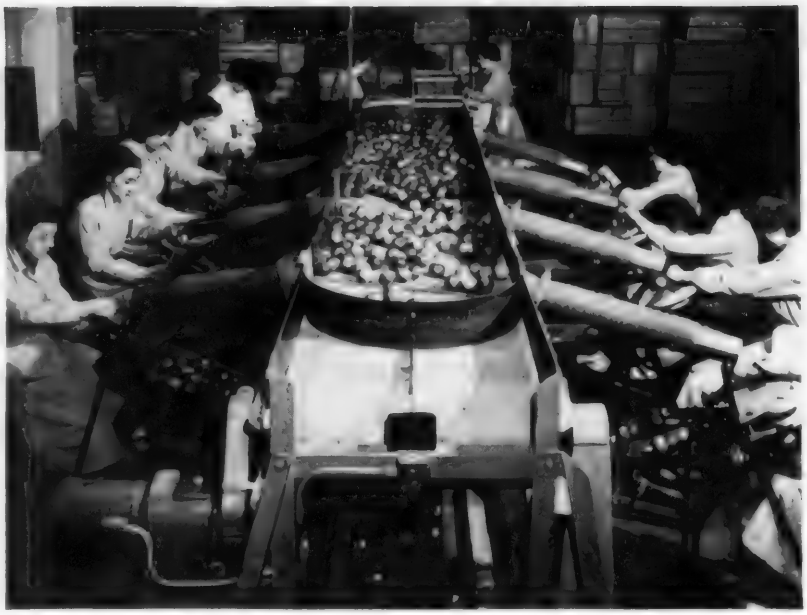
Ice cream packaging

The introduction of the new Family Brick by J. Lyons and Co., Ltd., is stated to be the result of 4 years research work by the company.

The faster ice cream is frozen the better the texture and flavour, but in the past it was necessary for the family brick to be filled into cartons at a higher temperature than is used for packaging smaller portions. In a new process developed by Lyons, the *Sleeveway* process, the temperature is lowered to make the ice cream firm and this carton built around it. This gives a smoother ice cream without alteration of the ingredients.

The new carton for the product is opened by removing the centre strip of the carton and lifting the flap off the inner sleeve.

The brick is available in 6 flavours.



Duplex 50 bag-sealing units assembled to give a production line turning out 120 packs of apples per min. at the Faversham factory of East Kent Packers, Ltd.

Bag-sealing dispenser

A bag-sealing unit made by P. P. Payne and Sons, Ltd., is being used by East Kent Packers, Ltd., in their Faversham factory.

The machine, the *Duplex* 50, is designed for prepackaging where the bag, or product container, is in the form of layflat or flexible moulded tubing material, and where the product to be packed is to be made into unit lengths.

The plastic tubing, in this instance polythene net, is pre-loaded on to the outside of a metal tube, down which the produce is fed by gravity.

The action of the *Duplex* 50 is to apply two seals at once and to sever the bag material or tubing between the two seals. One seal forms the closing of the preceeding bag and the other seal forms the first seal on the following bag prior to filling.

This aerosol stencil ink, called Spray, is marketed by J. and H. Rosenheim and Co.

Self-adhesive tape

John Dickinson and Co., Ltd., are now producing a complete range of cellulose self-adhesive tapes, marketed under the name *Holdfast*.

The new self-adhesive tape is available in 36 and 72 yd. rolls, in widths from ⅜ in. upwards.

High density polythene

British Resin Products, Ltd., have announced that the high density polythene which they are marketing on behalf of British Hydrocarbon Chemicals, Ltd., will in future be sold under the trade mark *Rigidex*.

Rigidex is made by a process developed by the Phillips Petroleum Co., who have licensed the manufacturing rights to British Hydrocarbon Chemicals, Ltd., a company jointly owned by The Distillers Co., Ltd., and The British Petroleum Co., Ltd.

Pre-packaged cheese

A pre-packed rindless Cheddar cheese is now being marketed by Kraft Foods, Ltd. This is known as *Cracker Barrel*, and not, as was erroneously stated in our March issue, as Red Barrel. It is wrapped in *Pukkafilm*, a wax-coated cellulose film developed as a result of work carried out in this field in the U.S.A. This can be used to re-wrap the cheese during periods of use. Experiments carried out at the National Institute for Research in Dairying have shown that provided it is kept under cool conditions, below 50°F., cheese wrapped in cellulose film in this way will retain its freshness for a week or more.

Trade Marks

PEE-ELL-JAY.—765,667. Fruit-juices and non-alcoholic beverages. **Pure Lemon Juice Co., Ltd.,** 130, Oval Road, Croydon.

VIRIBA.—765,897. Non-alcoholic drinks and preparations for making same; and fruit juices and tomato juice. **Modern Health Products, Ltd.,** Phœnix Works, Davis Road, Chessington, Surrey.

MCKELLAR WATT'S.—746,940. Sausage, cooked meat, black puddings, haggis and potted meats, all for sale in Scotland. **Alec McKellar Watt** trading as **McKellar Watt,** 26/28, Dobbies Loan, Glasgow, C.4.

WADDELL'S.—759,909. Canned meats, sausages and cooked meats, all for sale in Scotland and Northern Ireland. **Waddell, Ltd.,** 81, Napiershall Street, Glasgow, N.W.

KEYO. — 763,494 and **KEY-TOL.** — 763,496. Peanut butter, marmalade, canned fruit, canned vegetables, canned meat and desiccated coconut. **John Keyser,** Victoria House, Southampton Row, London, W.C.1.

BRAVO.—766,705. All goods included in Class 29. **Harold Frost and Co., Ltd.,** 6, Rood Lane, Eastcheap, London, E.C.3.

"SWEETHILLS." — B766,902. Dead poultry. **George Hammond Ackroyd,** Priory Farms, Nun Monkton, York.

ILIAD.—768,236. All goods included in Class 29. **Isaac Modiano, Brother and Sons, Ltd.,** 5 Lloyds Avenue, London, E.C.3.

ZULUGOLD.—767,514. Jams, canned fruits and canned vegetables. **Z.F.P. (Pty.), Ltd.,** Pinedene, Empangani, Zululand, Natal, South Africa.

STIMULA. — 758,244. Biscuits (other than biscuits for animals). **O. Kavli Aktieselskap,** Damsgaardveien 59, Bergen, Norway.

CRYSTAMINT. — 766,534. Non-medicated mint confectionery. **Joseph Terry and Sons, Ltd.,** The Chocolate Works, Bishopsthorpe Road, York, Yorks.

KANDYROO.—764,887. Non-medicated confectionery. **Lockhart, Smith and Co., Ltd.,** 5, Tilney Street, Park Lane, London, W.1.

YUM-YUM.—765,590. Chocolate confectionery and flour confectionery. **Melhuish and Harris Cakes, Ltd.,** Bryanston House, Lomond Grove, Camberwell, London, S.E.5.

CURIBA. — 766,669. Non-medicated confectionery made from mixtures of honey and fruit juice. **Modern Health Products, Ltd.,** Phœnix Works, Davis Road, Chessington, Surrey.

YASMIN.—768,445. Biscuits (other than biscuits for animals). **William MacDonald and Sons (Biscuits), Ltd.,** Glengarry Biscuit Bakery, Earl Haig Road, Hillington, Glasgow, S.W.2.

GRO-PUP.—B732,137. Foodstuffs for dogs. **Kellogg Co.,** Porter and Stiles Street, Battle Creek, Michigan, U.S.A.

COPRIN.—768,175. Foodstuffs for animals and malt. **Glaxo Laboratories, Ltd.,** 891-995, Greenford Road, Greenford, Middlesex.

TALISMAN.—757,362. Canned fish. **MacPherson, Train and Co., Ltd.,** Adelaide House, London Bridge, London, E.C.4.

LUPIN.—764,029. Carcase meat and meat offal (for food), all being frozen. **Anchorage Butchers (Pty.), Ltd.,** Nestlé House, 188, St. George's Terrace, Perth, Western Australia.

"CROSSED" FISH BRAND.—763,899. Canned shrimps. **Stavanger Preserving Co., Aktieselskap,** Nedre Strandgaten, 41, Stavanger, Norway.

DAIRYMAN'S DAUGHTER BRAND. 765,782. All goods in Class 29. **Isle of Wight Creameries, Ltd.** 21a, St.Thomas's Square, Newport, Isle of Wight.

DIANA.—746,759. Toffees. **Davison and Pickering, Ltd.,** 13-17, Stowell Street, Newcastle-on-Tyne.

CHOCABYE.—751,914. Chocolate flavourings other than essential oils. **Edward Hack,** Lion House, Red Lion Street, London, W.C.1.

MOONGLOW.—761,198. Chocolate and non-medicated confectionery. **Chocolate Cup Co. Ltd.,** Field Road, New Brighton, Wallasey, Ches.

QUAKER HONEY SNAPS.—763,811. Cereal preparations made with honey, for food for human consumption. **Quaker Oats, Ltd.,** Bridge Road, Southall, Middlesex.

PONTELLI.—764,058. Liquorice confectionery, non-medicated. **Dunhills (Pontefract), Ltd.** Hardwick View, Tanchelf, Pontefract, Yorks.

WALL'S BLUE RIBAND.—764,960. Ice cream. **T. Walls and Sons, Ltd.,** "The Friary," Friar's Place Lane, Acton, London, W.3.

SISTALB.—764,963. Mixtures for the manufacture of meringues and of meringue icing for cakes, pastries and the like. **Sistacream Co., Ltd.,** 27, Lister Road, Hillington, Glasgow, S.W.2.

SAVOURY PUFFLETS.—765,254. Biscuits (other than biscuits for animals) and cakes. **William Crawford and Sons, Ltd.,** 42, Elbe Street, Leith.

WAVENEY.—B765,489. Pies and puddings. **Co-operative Wholesale Society, Ltd.,** 1, Balloon Street, Manchester.

KIM.—765,490. Biscuits (other than biscuits for animals), shortbread and cakes. **W. and R. Jacob and Co. (Liverpool), Ltd.,**The Aintree Biscuit Factory, Aintree, Liverpool, 9.

WRENLET.—764,338. Cheese. **Trufood, Ltd.,** Wrenbury, nr. Nantwich, Ches.

NYMPHEA.—765,438. Meat, fruit and vegetables, all being dried, canned, preserved or bottled; and jams and marmalade. **Napier Brown and Co., Ltd.,** 23 and 25, Eastcheap, London, E.C.3.

SURPRISE.—765,901. Preserved, dried and cooked fruits and vegetables. **Batchelors Peas, Ltd.,** Limestone Cottage Lane, Wadsley Bridge, Sheffield, 6.

MOUNTAIN MIST.—765,900. Canned fruits. **Stevens and Brotherton, Ltd.,** 24, Philpot Lane, London, E.C.3.

SUNNY DALE TIPPS.—757,853. Tea, the produce of Ceylon. **E. F. and L. B. Miles,** trading as **Henry Miles and Co.,** 84, Victoria Road, Sutton Coldfield, Warwick.

PEP-O-MIX.—764,867. Non-medicated confectionery. **James Pascall, Ltd.,** Furzedown Works, Streatham Road, Mitcham, Surrey.

CRISPETS.—765,250. Chocolate, chocolates and non-medicated confectionery. **H. J. Packer and Co., Ltd.,** 87, Carlyle Road, Greenbank, Bristol.

TRELCO BRAND.—764,900 and 764,901. Animal feedingstuffs. **F. Tyrrell and F. Higson,** trading as **Fredk. Tyrrell and Co.,** Trelco Works, Dawes Street, Bolton, Lancs.

TARZAN.—765,670. Chocolate, chocolates, chocolate couverture and non-medicated confectionery. **Nestlé Co., Ltd.,** Hayes, Middlesex.

New Companies

Associated Family Bakers, Ltd. (596582.) 21, Gt. George Street, Bristol, 1. £60,000. Dirs.: I. H. Howard, H. A. Kear, C. H. Bosley, W. E. Hughes, S. C. Richards, S. H. Taylor and A. A. Bright.

Bagshaw's (Denton), Ltd. (595800.) 109, Haughton Green Road, Denton, Lancs. Mnfrs. of cooked meat, etc. £10,000. Dirs.: L., J. W., M., and D. Bagshaw.

Ballam, Neil and Howes, Ltd. (596630.) "Roman Heights," High Park Road, Broadstone, Dorset. Mnfrs. of and dealers in sweetmeats, candies, etc. £15,000. Subs.: D. R. Sibley and R. E. Draper.

Banana Loaf Co., Ltd. (596421.) 16, Coleman Street, London, E.C.2. Mnfrs. of and dealers in banana loaves and cocktail savouries; bakers, etc. £2,000. Dirs.: Mrs. K. L. and T. N. Belitoreanu.

R. A. Duckett and Co., Ltd. (596604.) 24, College Street, Burnham-on-Sea, Som. Mnfrs. of and dealers in cheese, butter, milk powder, cream, etc. £500. Dirs.: R. A. Duckett and Mrs. M. E. C. Duckett.

Honeybridge Dairy (Ashurst), Ltd. (596042.) Room 5, 4th Floor, Radnor House, 93/7, Regent Street, London, W.1. £500. Dirs.: M. W. Kerr and J. Foster.

Ingham Bros. (Sausage Manufacturers), Ltd. (595640.) Central Hall, Union Street, Halifax. £2,000. Dirs.: F. and G. Ingham.

Little Farm Sausages (Ponteland), Ltd. (595115.) 12, West Road, Ponteland, Northumberland. £1,000. Permt. dirs.: J. Thompson, K. F. and R. W. Hilder.

Moore Bros. (Confectioners), Ltd. (591668.) 21, Market Street, Cinderford, Glos. £6,000. Dirs.: F. L. C., A. H. E., Mrs. E. and Mrs. M. Moore, Mrs. A. B. and R. Morse.

J. and W. Norton (Meopham), Ltd. (595760.) Miller and corn merchant. £5,000. Dirs.: L. M. Morton, Orchard House, Meopham Green, Kent, and V. R. Moorby.

Nut Kernel Products, Ltd. (595560.) Rectory Road, Upton-on-Severn, Worcs. £2,500. Permt. dirs.: S. R. and Mrs. S. F. Sheen.

Pet Delicacies, Ltd. (595594.) Norwich House, 13, Southampton Place, London, W.C.1. Mnfrs. of and dealers in pet foods, etc. £100. Dirs.: W. D. and G. Redmond.

F. Perkins and Son, Ltd. (596522.) 1, Coleshill Road, Ward End, Birmingham, 34. Cake and corn mchts., millers, etc. £10,000. Dirs.: F. H., Winifred, and D. F. Perkins.

Smiths Buckingham Mills, Ltd. (596226.) Flour, provender and grist millers, etc. £3,000. Permt. dir.: Anne E. Knight, Nobottle House, Brington, Northampton. Sub.: H. M. Lepper.

Southwark Bakeries, Ltd. (595195.) 104, London Road, London, S.E.1. £5,000. Permt. dirs.: J. C. and Helena C. George.

Winslades Mineral Water Co., Ltd. (596486.) Machen Place, Cardiff. £10,000. Subs.: C. Russell and Joyce Jones.

These particulars of new companies recently registered have been extracted from the daily register of Jordan and Sons, Ltd., Company Registration Agents, 116, Chancery Lane, London, W.C.2.

Recent Patents

COMPLETE SPECIFICATIONS ACCEPTED

791,193. M. J. Willard and J. Cording: Production of dehydrated mashed potato.
791,211. S. Liston: Apparatus for the production and treatment of doughs.
791,274. Paper Cap Manufacturing Co., Ltd.: Apparatus for applying caps or closures to jars or like containers.
791,376. J. Harradine and Sons, Ltd.: Colouring of silver dragees.
791,402. C. Freudenberg Komm.-Ges. auf Aktien: Method and apparatus for making artificial sausage casings.
791,810. Norman and Eldred, Ltd., and H. R. Eldred: Machine for dicing frozen meat and the like.
792,640. K. Ritter: Refining process for use in the production of ground vegetable products.
792,651. Birds Eye (Holdings), Ltd.: Fish processing.
792,891. Esso Research and Engineering Co.: Can coating compositions and methods of making them.
793,393. McDougalls, Ltd.: Conveyance of powdered and granular materials.
793,476. R. Szarejko: Construction of filter presses, especially for filtering beet juice.
793,539. A. Harvey: Apparatus for manufacturing meat or fruit pasties and the like.
793,569. Meyer Liquid, Ltd.: Apparatus for preparing carbonated beverages.
793,580. R. Kellie and Son, Ltd.: Preservation of food products.
793,976. Monsanto Chemicals, Ltd.: Preservation of teas.
793,900. E. Jensen: Capping containers such as bottles and caps.

ABSTRACTS OF BRITISH PATENTS

Improved flour or dough

A process is claimed in which a small quantity of ascorbic acid and/or reductic acid is added together with a small quantity of glucose-oxidase-containing preparation to flour or dough. The last-named compound is said to enhance the flour-improving properties of these acids very markedly. The quantity of ascorbic and/or reductic acid added to the flour is in the region of 0·2-2 gm. per 100 kg., while the quantity of the glucose-oxidase-containing preparation is in the amount of 5,000-10,000 glucose-oxidase units per gm. of ascorbic acid and/or reductic acid.

An agent may be prepared which incorporates the ascorbic acid and/or reductic acid and the glucose-oxidase-containing preparations in the same proportions.—787,225. *Koninklijke Industrieele Maatschappij Voorheen Noury und Van der Lande, N.V.*

De-freezing and heating deep-frozen foods

A method of de-freezing and heating deep-frozen foods, more particularly fully prepared meals, has the foods disposed within a chamber adjacent to one another in superposed layers forming a block with spaces within the layers. The food is subjected to the influence of a current of hot air circulating within the chamber and passing over the foods. A current of hot air from a fan is made to flow in a closed circuit around the outside of the block, returning through the spaces within the layers of food.

Apparatus for putting this invention into operation has a chamber housing a multi-stage rack for holding a number of food containers, an air-circulating fan and a heater for the air supplied to the fan. Baffles are arranged in the way of the air current to direct the air to a duct enveloping the block formed by the container assembly and return it through the individual stages of the rack to the suction side of the fan.—787,159. *Burger Eisenwerke G.m.b.H.*

Resistor thermometer

A thermometer suitable for making absolute and difference measurements is the subject of this invention. Use is made, when making difference measurements, of two temperature feelers in the measuring part of the bridge, each interposed between a branching point and the tapping point of the diagonal of the bridge. The provision of an additional grid resistor which by-passes the calibrating resistors within the control part of the bridge is stated to be advantageous.

One of the temperature feelers is replaced by a resistor serving as a reference resistor when making absolute measurements. This corresponds in its magnitude to a mean resistance of the temperature feeler. This reference resistor should not alter its resistance value under the conditions of its operation. On the other hand, the resistance of the temperature feeler in the other branch of the bridge will, under the influence of temperature, assume different values and thereby vary the grid voltage of the valve.—789,000. *Georg Weisheit and Research Interests, Ltd.*

Dough feeder

This invention relates to a device for feeding dough in a finely divided state—for example, on to a conveyor band of a continuously working baking oven. The apparatus has a rotatable brush adapted to be fed with a film of the dough. Upon rotation, the brush passes over a tapered lip or edge, throwing the dough forward in the form of finely divided particles. The brush is rotated from the forward end of a feed box from a mounting therein. Part of the periphery of the brush is in contact with the concave part of the feed box, the radius of the concave part being less than that of the brush.

The feed box itself is divided into two parts—a supply chamber in which the brush is mounted and an overflow chamber. The partition may serve to regulate the amount of dough which may be fed to the supply chamber at any one time. The brush may be fed by a transfer roller, and they may both be connected by a variable speed drive. An adjustable blade may be fitted to regulate the thickness of the film of dough.—790,726. *W. Bahlsen.*

Improved sterile concentrated milk

This invention comprises a method of preparing a concentrated milk in which whole milk is first sterilised by heating, approx. 6 sec. at 300°F. or for 5 min. at 250°F. The milk is then evaporated at a sub-atmospheric pressure. If the temperature of the milk falls below 120°F. at the end of this process it is heated to that temperature before it is homogenised. The milk may be reduced to approximately one-third of its original volume by this method.

The milk is afterwards filled into sterile air-tight containers. All the operations are carried out under aseptic conditions.—790,972. *Continental Can Co., Inc.*

Steam cooking food

A method designed to give rapid and uniform cooking, with minimum loss of flavour and nutritive value, is claimed. According to this invention, the food is cooked in a flowable condition by being first delivered to a flow of steam travelling through a closed chamber at a velocity sufficient to entrain the food and to keep it in suspension. A pressure is chosen to heat the food in the time that it is kept within the enclosed environment. Accordingly, the steam exists as a continuous phase and the food particles are kept in suspension as a discontinuous phase by reason of the pressure of the steam. Each particle is separately enveloped in the continuous atmosphere of the steam.

On leaving this environment the articles discharge into a separator, where temperature is rapidly lost as the steam expands.

Equipment is provided for carrying out the invention.—790,969. *H. J. Heinz Co.*

Preparing fish products

In this invention a process is claimed for preparing a compact, coherent fish product. The surface of individual pieces of fish flesh is softened by treatment for a short time with an aqueous solution which has an alkaline reaction of at least *p*H 8. The solution contains an alkali metal hydroxide and/or an alkali metal salt. The pieces are then assembled in a juxtaposed position in contact with one another and held in that position at a temperature not exceeding 10°C. until the pieces of flesh adhere to each other. The pieces are afterwards frozen.

In one example of the process the pieces of fish are immersed for a period of 5-10 min. in a solution of 0·4% NaOH plus 0·6% Na_3PO_4 at room temperature, and are then packed in freezing moulds and deep-frozen.—790,812. *H. Barez.*

New patents are from the Journal of Patents and new trade marks are from the Trade Marks Journal. In each case permission to publish has been given by the Controller of Her Majesty's Stationery Office. Each of the publications is obtainable from the Patents Office, 25, Southampton Buildings, London, W.C.2.

Wood engraving by John Farleigh

Running to save m'lady

RUNNING FOOTMEN were accustomed to running in front of their masters' carriages, clearing the way ahead, but sometimes they had more exciting tasks to perform. During the reign of the first Elizabeth, Lord Berkeley's wife fell ill and Langham, running footman to his Lordship, "carried a letter from Callowden to old Dr. Fryer, a physician dwelling in London, and returned with a glass bottle in his hand, compounded by the doctor, for the recovery of her health, a journey of 148 miles performed by him in less than forty-two hours, notwithstanding his stay of one night at the physician's house; which no one horse could have so well and safely performed; for which the Lady shall after give him a new suit of clothes."

Today, merchandise travels faster than in Langham's time but rarely does one man guard it to journey's end. Manufacturers look after their goods by packing them snugly and safely in cartons made from 'Thames Board', and in 'Fiberite' cases made from solid or corrugated fibreboard.

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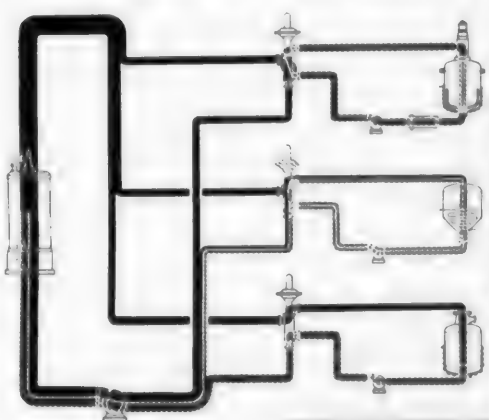

Flow diagram illustrates use of unique 4-way valve to give cooling: intermediate or maximum temperatures.

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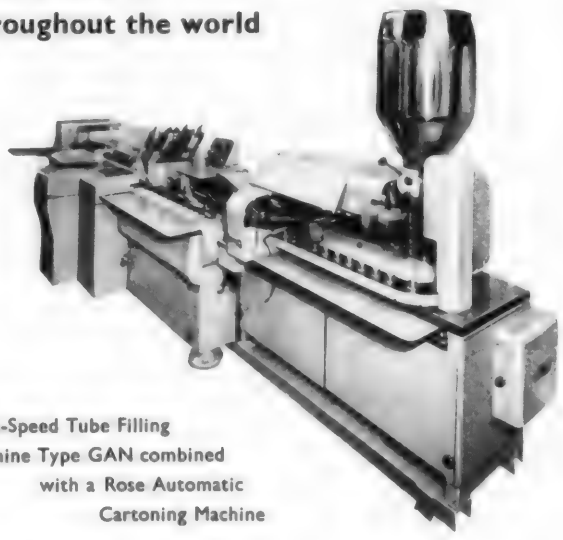

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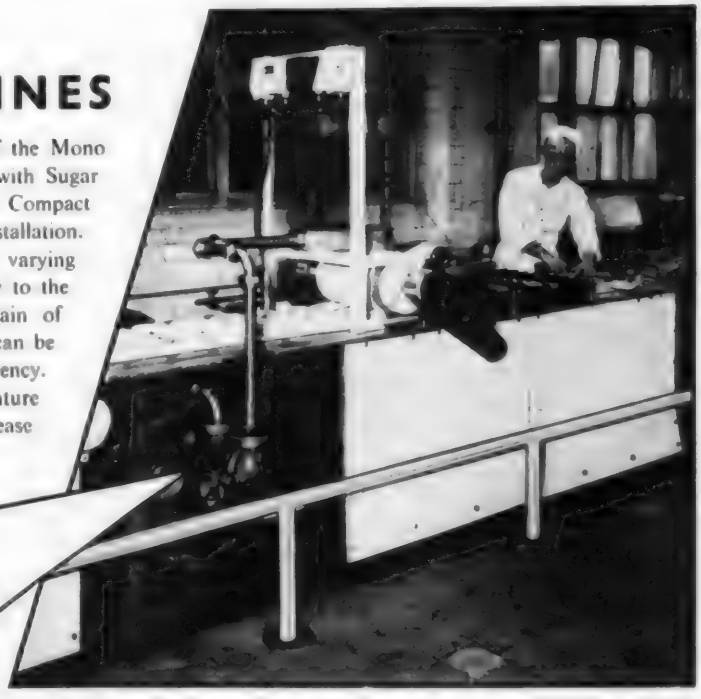

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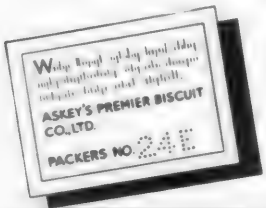

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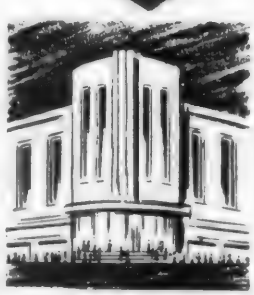

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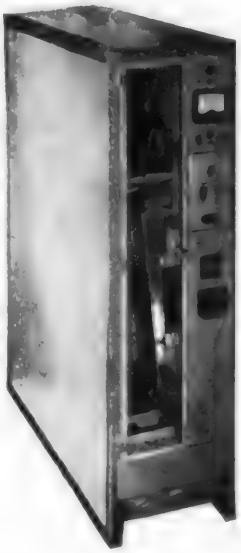

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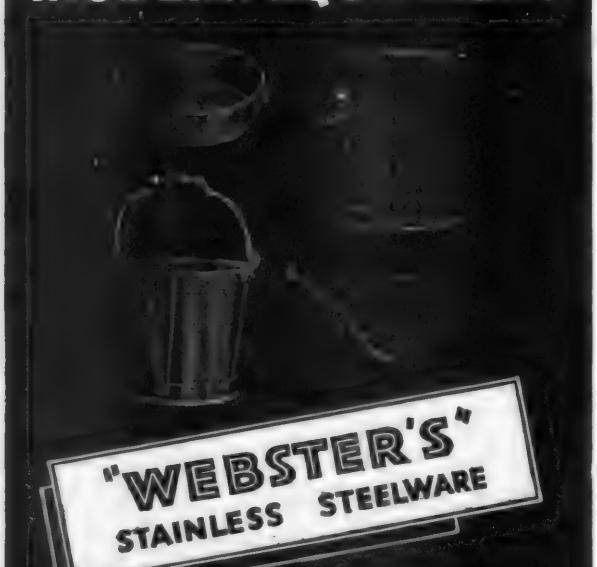

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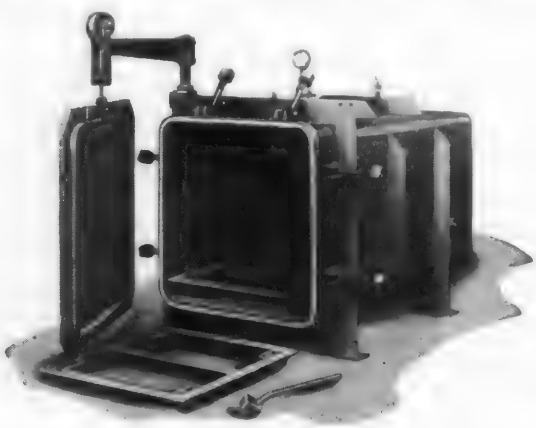

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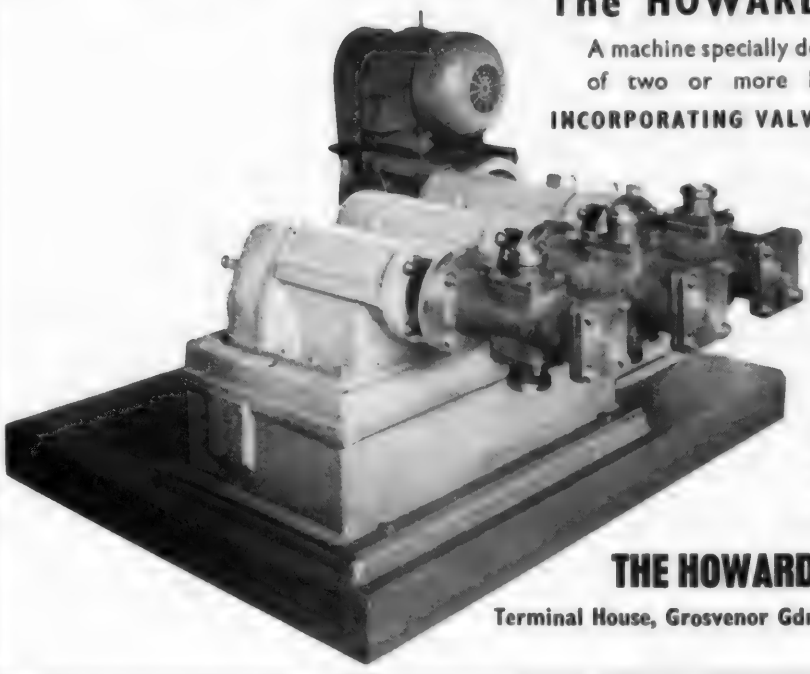

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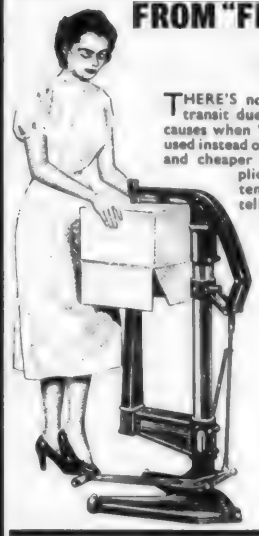

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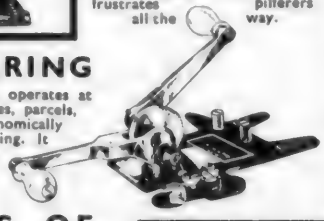

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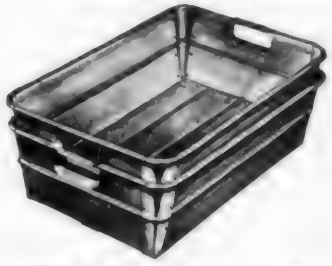

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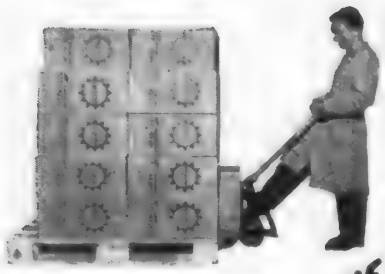

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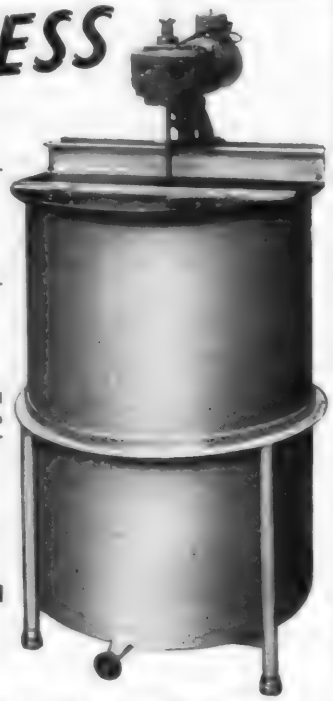

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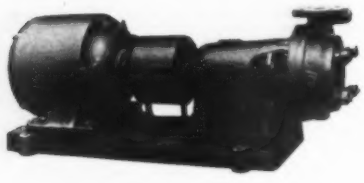

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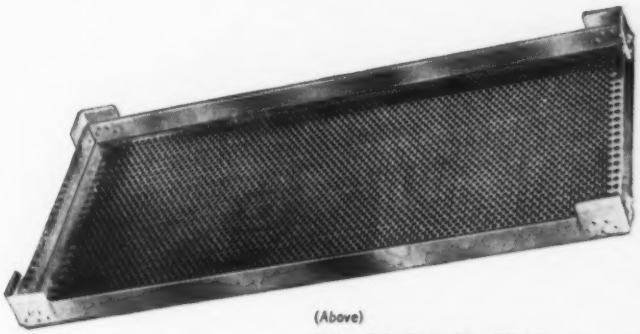

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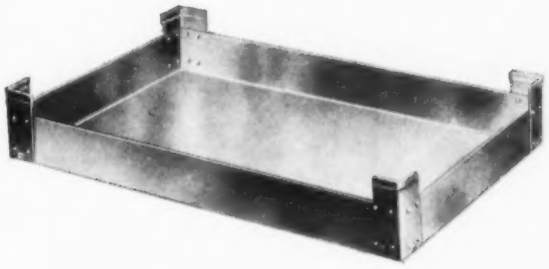

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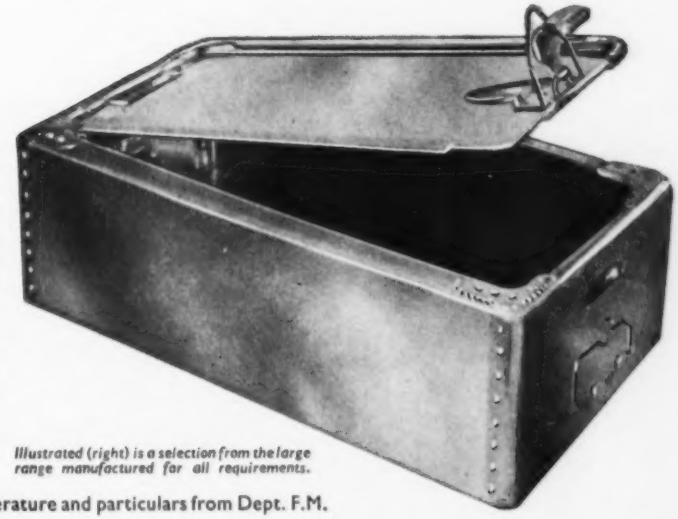

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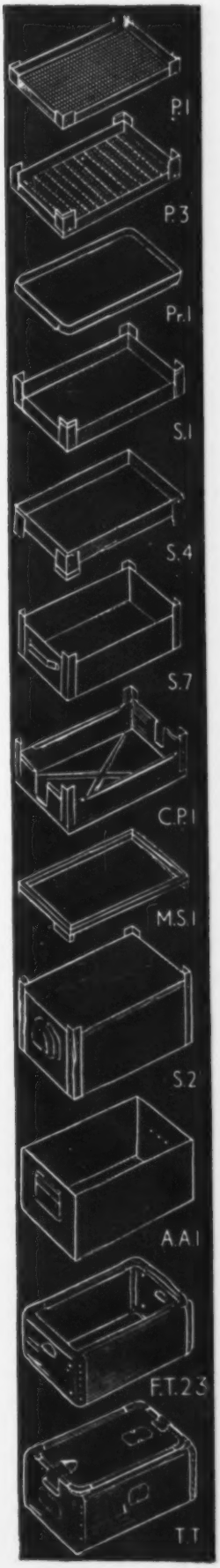

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